

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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Steam Shears.

The accompanying illustration represents a heavy shear built by Messrs. Breuer, Schumacher & Co., of Kalk, near Cologne. As will be seen from the engraving, the machine is intended for the heavy work of steel makers and others who need the most powerful machinery of the kind. The gearing is placed in the center of a box frame well stiffened, at the sides of which the shears are located. At the side or end next the observer the engines are placed, the steam cylinders being at the bottom. The crank-shaft is common to both, and carries a very heavy fly-wheel; also the spur wheels by which the large gears are driven. The pillow blocks are carried by brackets on the side of the frame, to the bottom of which the castings forming the guides are bolted. The cranks are not of the disk pattern, but carry eccentric disks, which we judge are used to balance the weight of the cranks. The cylinders are 16 inches stroke and 12 inches bore. The bearings are of bronze and are 6 1/4 inches long, thus giving a very good bearing surface. The eccentrics are placed just inside these bearings, and drive the valves through straight connecting rods and valve stems. To accomplish this, it is necessary to make the steam passages very long, and place the valves at some distance from the cylinders. The guides are of a form quite common in American portable engines, both being cast in one piece, and we judge are finished by boring out. We have no details of the motion by which the shears are moved, but from the engraving it would seem to be a cranked arrangement of some kind. The slides are counter-balanced, and one of the weights is shown lying on the ground at the left in front of the machine. Set screws and a gib afford means for taking up wear and keeping the shears at the proper distance. The weight of the double machine is 62,000 pounds. This is reduced to 33,000 pounds when only one cylinder is put on, in which case, however, the machine is of somewhat smaller dimensions. An extra steam cylinder can be put on these lighter machines when desired and their power be greatly increased. This shear is particularly interesting as illustrating the tendency of modern tool builders to use independent engines to drive large single machines, instead of carrying power to them by means of shafts and belts.

Fuel Waste in Furnace Fires.

At the last meeting of the Engineers' Society of Western Pennsylvania, Mr. William Metcalf, of Pittsburgh, read the following paper:

It is proposed to show by figures obtained by actual working data how much money is annually thrown away in Allegheny County by throwing money into our furnaces in the shape of coal, to be sent wasted out of the tops of stacks in the shape of dirty, useless smoke, and data of old style furnaces are obtained from some of our ablest and most reliable iron manufacturers. The data of the new style furnaces are obtained from personal experience, and from a few iron makers who have tried and who are adopting the new style furnaces. By the old style furnace is meant the ordinary reverberatory furnace; and by the new style is meant any good regenerative gas furnace. The data of quantities of iron made are taken from the paper of Wm. F. Shinn, on "Statistics of Pittsburgh's Manufactures," read before the American Institute of Mining Engineers, in May, 1879. The price of fuel is assumed as the probable average cost of the fuel laid down at the furnace. If the price should be too high or too low in any case, the correction can easily be made for any particular mill by parties interested.

In stating that 40 bushels of coal are used in puddling a ton of iron, I am well aware that many iron men say puddling can be done, and is done, with 30 bushels per ton, but on the other hand some of the very best and most experienced men say that 40 bushels is nearer the actual figure of the amount used. Again, I have placed the quantity of slack used in a gas furnace at 20 bushels per ton of iron, which is the highest quantity I have ever known to be used, while I do know that 15 bushels is nearer the actual consumption, and there are furnaces now building which, I believe, will produce regularly a ton of muck iron with 10 bushels of slack. For the gas furnaces these figures include the consumption of fuel and wages of gasmakers from Saturday noon until Monday morning, during which time the furnaces are kept hot and are idle.

For heating I have used equal quantities of coal for one style and of slack for the other, as given by iron men, although I am satisfied that this is an error in favor of the reverberatory system; but not having measured these quantities myself, I take the data of those who have made the comparison by actual measurement. I would call your attention particularly to the enormous differences by loss in oxidation or heating. We have them for puddling.

Old style, 40 bushels coal, at 6c.....	\$2.40
New style, 30 bushels, at 3c.....	1.50
Difference in fuel.....	\$0.90
Deduct for gas making.....	.40
Saving in fuel in puddling ore, per ton.....	\$1.30

REHEATING.	
Old style, 18 bushels coal, at 6c.....	\$1.08
New style, 13 bushels slack, at 3c.....	.39
Difference in fuel.....	\$.69
Deduct for gas making.....	.31
Saving in fuel per ton.....	\$.38
Loss by oxidation or scaling—old style, 10 per cent., 224 pounds per ton; new style, 6 per cent., 134.4 pounds per ton. Saving in iron by scaling, 89.6 pounds, equal, at 2 1/2 cents a pound, to \$2.24. This gives us:	
Difference per ton of muck bar.....	\$1.38
Difference per ton in fuel for heating.....	.33
Difference per ton in fuel for scaling.....	\$2.24
Total saving in one ton of bar iron, once reheated.....	\$3.95

Mr. Shinn's paper gives the quantity of rolled iron produced in Allegheny County in 1878 as 252,083 tons of 2240 pounds. Assuming this, and multiplying by the figures just given, we have:

Loss in puddling—252,083 multiplied by \$1.38 equals \$347,874.54.

material that scales away, less only the value of the tap cinder. The workman loses the wages of this amount because it would increase neither his hours nor labor perceptibly if the additional yield were made. And finally, the manufacturer loses the profit of this amount, as its sale and distribution would not increase his expense account. These figures are erroneous and fairly open to criticism; yet I know of one instance where a careful record of several gas furnaces which cost from \$10,000 to \$15,000 showed that each furnace paid for itself every year, and in another case where a furnace which is not so well arranged as it ought to be, and which cost less than \$15,000 per year, and of another case where the gas system was only partially in use, where there was a saving in the total annual fuel bills per ton of product of 46 per cent. Several questions will naturally occur—as, What is the wear and tear? How much fix does the new style furnace consume? What

because it is difficult for the river mines to dispose of a large part of their slack, and again, the run-of-mine coal works so much stronger than slack in the producer that it can be used at about the same cost per ton of yield of furnace. The gas heat is uniform, continuous and very soft. Iron comes from the furnace thoroughly heated through without being burnt, so that the usual exclamation of the men is: "It is soft as butter." The work done in the gas furnace is, on the whole, much better than that done in a reverberatory furnace, because the heat is more uniform, and it requires the grossest carelessness to burn iron in a gas furnace. Besides, the work is so very much easier for the men that they naturally do much better work, because their labor is not so exhausting and they take more interest in it. This is a point of no little importance, for it is easy to obtain a very high quality of finish at no increase of cost, and when men are contented the troubles of the "bosses" are very light. No

want to be understood as claiming to be, in the works with which I am connected, in advance of the rest of the world. We still use some of the wasteful style of furnaces, and a complete emancipation from old ways is always difficult to accomplish; but we are making as rapid a development of the use of regenerative furnaces as we can. One field for the regenerative gas system is still unoccupied. I refer to the firing of steam boilers. Some Germans have recently shown that by gas firing 90 per cent. of the fuel will evaporate double the quantity of water in a given boiler. This simply means that any concern can double its steam producing capacity at a very trifling cost, with no increase of plant. A battery of boilers is now being fitted in this city with regenerative gas fires, and if the results claimed by the Germans are realized, the facts will be laid before the society at an early day. In the mean time the subject commends itself to every one who is interested in economy and cleanliness. The economical side of the question has been shown. The cleanly side is accomplished of necessity; first in the greater cleanliness of the works, and, second, from a reduction of the smoke nuisance, for it is well understood by all who know how to work a gas furnace, that a smoky stack is a sure sign of a furnace that is in bad order; therefore smoke from a gas furnace is always inexcusable.

After the paper had been read an informal discussion followed. Mr. Perkins said he had found the gas system successful for welding cast steel, and Mr. Metcalf, in reply to inquiries, said that the gas could be used profitably, even at present figures, for heating private houses, and there is no danger whatever from explosions. Mr. Hunt stated that there was danger of explosions only where a gas made from sawdust is used, as in Sweden. On motion of Mr. Millar, of the Atlas Works, the subject was continued to the next meeting.

The Law of Corporations.

In the case of Jacob Lorillard as appellant, a decision of importance in reference to the organization of corporations under the statutes of this State. In June, 1874, Jacob Lorillard and the firm of William F. Clyde & Co. were competitors in the transportation business by water between New York and Philadelphia, each owning vessels engaged in that business. They then entered into an agreement to consolidate the business of both under a corporate management according to the laws of the State, with a capital of \$300,000, to be represented by vessels belonging to each, at a valuation agreed to and amounting in the aggregate to \$300,000, each to receive half the amount of the stock and Clyde & Co. to have the management of the corporation, guaranteeing that Mr. Lorillard should have dividends amounting to at least 7 per cent on the amount of his stock. The plaintiff brought a suit to recover from the successors of Clyde & Co. two years' dividends under the agreement. The defendants demurred to the complaint, claiming that it did not constitute a cause of action on three grounds—first, that the agreement was illegal in that only five persons formed the corporation instead of seven, as required by statute; second, in that the agreement provided that the property shall be taken to represent capital at a valuation fixed by the parties; and third, that the stipulation in the contract vesting the management of the corporation in William F. Clyde & Co. was against public policy and rendered the contract illegal, because it was an attempt to provide in advance for the control of the corporate affairs and withdraw it from the trustees and stockholders, to whom it properly belonged. The complaint was dismissed and the case was carried on appeal to the Court of Appeals, where it was argued by Mr. H. race Barnard on the part of the plaintiff and Mr. Tunis Bergen on behalf of the defendants.

The Court in its opinion, written by Judge Andrews and concurred in by his associates, holds on these points respectively that upon the allegation of the complaint that "the corporation was duly organized under the laws of the State, it must be assumed that the corporation was regularly organized; that it cannot be assumed that the transaction was not bona fide or that the valuation put on the vessels was fictitious or extravagant; that the value of the stock would depend on the value of the property and business; that the parties fixing the valuation were the only parties in interest, and the Court knows of no principle of public policy which condemns an agreement between parties about to form a corporation because, by the arrangement, the capital stock is to be represented by property which they severally contribute at a valuation agreed to between themselves; that if it appeared that the organization of the corporation in this way was a device to defraud the public by putting a valueless stock in the market, have an apparent basis only, a different question would be presented." The Court further holds that the other points taken by defendants upon demurrer cannot be sustained, and, therefore, reverses the decision of the court below dismissing the complaint, but without leave to defendants to answer on payment of costs.

Loss in heating, in fuel—252,083 multiplied by 33 cents equals \$83,187.39.

Loss in scaling—252,083 multiplied by \$2.20 equals \$554,665.92. Total loss, \$995,797.85.

An iron maker who was consulted in the matter estimated that 25 per cent. of the iron made is twice heated. Assuming for this quantity one-third of the above difference in scaling as a probable safe estimate, and all of the difference in fuel, we have:

74.6 loss for scaling, plus 33 cents for fuel, equal \$1.07.6 as the total loss in this operation. Twenty-five per cent. of 252,083 equals 63,020 in round numbers; 63,020 plus 1076 equals \$67,809.52. Adding the above total, \$995,727.85, we have \$1,063,537.37 as the total annual price paid in Allegheny County for the bonfires we keep at the top of our furnace stacks. At first sight it may seem incorrect to assume the loss in scaling at 2 1/2 cents per pound. You will understand, of course, that there is no way of getting at exact selling prices, and it is probable, when we consider how much iron goes into special forms, that the "card" is about the average price. Again, the selling price is proper because the manufacturer loses the

is the cost of a gas furnace? Will not slack increase in price? What sort of heat do you get? Is the work as good?

As to the wear and tear, I believe it to be much less in a gas furnace than in a reverberatory furnace. A careful record of our run of a puddling furnace when 552 tons of muck were produced, showed that the total cost of rebuilding, including castings, bricks, fire-clay and all wages, amounted to 32 cents per ton. For heating I have no figures, but I know of one furnace that ran six years, alternately heating iron and steel, before the crown gave out, and then only about one-third of it had to be replaced; and during those six years I do not think \$50 all told were spent for little repairs, such as relining the doors. In puddling strong pig containing not over 2 per cent. of silicon, about 350 pounds of fix, wet weight, are used per ton of muck.

Gas furnaces, including producers, but not including royalties, can be built for about the same cost per ton of capacity as ordinary reverberatory furnaces. Slack might increase in price if all of the mills of Pittsburgh would use only slack, but it is not likely that much increase would occur,

account has been taken of the wages question, because with the above stupendous figures it is a question not worth considering in this connection; but it is a fact that men can do from 10 to 20 per cent. more work on a gas furnace than on a reverberatory. They can do it easier and they can do it better; therefore the new style gives the working-man a chance to make money, too, without interfering with present lists, and the gas system requires as many hands as the other, if not more, therefore its introduction need cause no opposition.

It has been suggested that the publication of this paper, if the statements given are all correct, might injure Pittsburgh by inducing outside manufacturers to adopt the gas system. The fact is, shrewd manufacturers from parts of the country as widely separated as New England and the Pacific Slope have visited Pittsburgh repeatedly, have examined this system carefully, have adopted it extensively, have written back that they were delighted with it and were pushing their changes rapidly. Under these circumstances it is barely possible that it is worth our while to look to our laurels.

In conclusion, I wish to say that I do not

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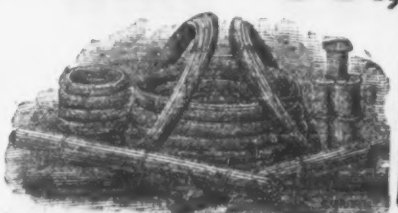
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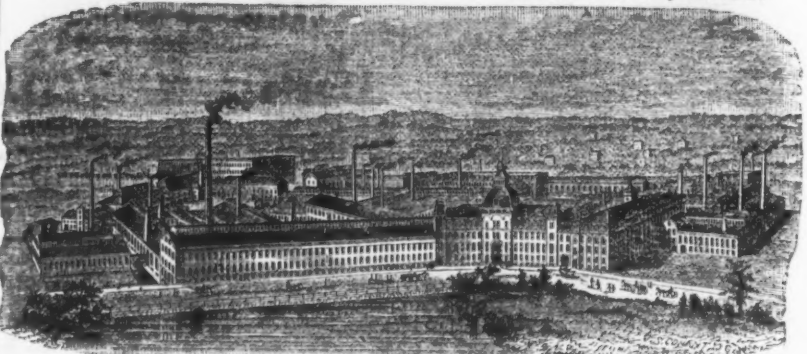
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The Art of Founding in Brass, Copper and Bronze.

BY EDWARD TUCK.

(Concluded).

In addition to these pillars, there was the Brazen or Bronze Altar, another gigantic work probably weighing about 200 tons; also the Molten Sea, an immense semicircular vessel measuring 17½ feet in diameter and 8½ feet deep, and containing 16,000 to 20,000 gallons of water, supported on a pedestal of twelve bronze oxen. We get no idea from the account of the size of these castings, but they must have been of sufficient size and strength to support the vessel, which, when filled with water, would weigh probably 100 tons.

In addition to these large articles, there were a great number of smaller ones, equally good in construction and workmanship, but a full description of these must be left to a further article. It is apparent that different qualities of bronze were used, for some of the articles are stated "to be of bright brass," evidently different mixtures of the alloy for the differing purposes. It is clear from the vast size of the castings that good mechanical contrivances must have been used to remove, fit up and place them in position.

These works were cast "in the Plain of Jordan, in the clay ground," or, as should be more correctly rendered, "in the depth of the clay ground between Succoth and Zarthan," showing them to have been molded in clay. Such large quantities of metal would require to be melted in a series of furnaces, in which the metal could be fused at one time, all tapped together and the metal let run into the mold. A series of such furnaces would be constructed in a sort of circle or square, under one large dome or roof, forming a chimney or tower.

It is most probable that such a method was adopted in these days, as we find from Nehemiah iii, 11: "Malchijah, the son of Harim, and Hashub, the son of Pahath-moab, repairing the other piece and the tower of the furnaces." This would refer to such a structure which, erected in the Plain of Jordan for the temple works, may have continued a sort of national foundry up to the time the Jews were carried captive into Babylon. And again, the restoration and consequent rebuilding of the Temple would require the same operations, and hence the repairing of the furnaces would be a necessary work.

The knowledge of the art of working in metals thus brought into Palestine by the Tyrians at the building of the Temple seems not to have afterward declined, for we find frequent references in Scripture to works of this kind. In 740 B. C. King Ahaz, visiting King Tiglath-pileser at Damascus, saw an altar which pleased him, and sending Urijah, the priest, a drawing of it, one was made for him exactly similar. In 596 B. C. Nebuchadnezzar, King of Babylon, broke up the bronze pillars, the sea, and the bases of the Temple at Jerusalem, and removed the pieces to Babylon (a work of considerable difficulty), and it follows that probably many of the bronze articles found by Sir H. Layard and others in the ruins of that city may have been made from the bronze of the Temple furniture.

A singular confirmation of the idea that the brass and copper of Scripture are bronze is given by Mr. Edwards in the *Edinburgh Philosophical Magazine*, 1850, where he describes certain relics found near Marazion or Marghazin, one of the oldest towns in Cornwall, leading to the conclusion that the Jews had smelting houses near the shore. The remnants of these smelting pits are still called by tradition Jews' houses, and the town itself is also called Market Jew, in addition to Marghazin, which means Market Mount; called so, no doubt, by the Jews, as the place where the metals were purchased and sold. Possibly the bronze alloy, the mixture of copper and tin, may have been cast here in ingots and shipped in that form; but this is conjecture.

The bronze of classical antiquity (Greek, χαλκός; Latin, *as*) consisted of copper, with an alloy of one or more of the following metals—tin, lead, silver, zinc; the quantity and character of the alloy changing with the changing times or different purposes. Among existing bronzes, copper varies from 67 to 95 parts. The Phoenicians who traded with the Egyptians would also bring the tin alloy to the Greeks and Romans. Homer calls the metal *Kassiteros*, and this is equivalent to the Arab word *Kasdeer*, by which tin is known in the East; it is also called *Kastira* in Sanscrit. We are enabled from the analysis of coins to arrive at some results as to the admixture of the metals. It thus appears from their coins that the Greeks adhered to a mixture of copper and tin till 400 B. C., after which they used lead. Silver is rare in these coins.

The Romans used lead in their coins, but gradually reduced the quantity, till, under the Emperors Caligula, Nero, Vespasian and Domitian, they coined pure copper, but afterwards reverted to the mixture of lead. This word *χαλκός* originally appears to have been the word for pure copper, and is so employed by Homer, who calls *εργαῖος* (red), *αἰθιαῖος* (glittering), *φαιεννός* (shining), terms which will apply to pure copper or the bright alloys of bronze, such as the ancient mirrors were made of.

The old Greek poet describes the process of casting in almost similar terms to those in which it would be poetically described to-day, showing us that the processes then used and now were as nearly as possible alike, and proves the art of working the various substances to have been well understood at that remote period.

The passage referred to is in the *Iliad* of Homer, in the description of the manufacture of the shield of Achilles by the god Vulcan:

Thus having said, the Father of the Fires To the black labor of his forge retires. Soon as he bade them blow, the bellows turned Their own mouths; and where the furnace burned Resounding breathed: at once the blast expires, Just as the god directs; now loud, now low, They raise a tempest or they gently blow. In hissing flames huge silver bars are rolled, And stubborn brass, and tin, and solid gold,

Thus the broad shield complete, the artist crowned With his last hand, and poured the ocean round: In living silver seemed the waves to roll, And beat the buckler's verge and bound the whole.

In this description of the casting, Homer uses the word *χαλκός*, so that we can scarcely tell whether he means copper pure or alloyed. Further, it is more difficult when we read of the mythical Dactyles of Ida in Crete, or the Cyclops, being acquainted with the melting of *χαλκός*. It is not, however, likely that the later Greek writers, who knew bronze in its real sense, would have used the word *χαλκός* without qualification to objects which they had seen, unless they meant it to be taken as bronze.

Pausanias speaks of an old statue he had seen made of separate pieces of metal fastened together with nails, and, using the same word, we understand him to mean bronze, as there exist very early figures of bronze thus made. We read also of the process called "sphyrelaton," being to hammer out the plates and fasten them together with nails. Pausanias also tells that "the Phoenicians pretended that Ulysses dedicated a statue of bronze to Neptune Hippias," but adds that "he does not give credit to the statement, as the art of fusing the metals and casting them in a mold was not then known." "In fact, the first who cast statues were Theodorus and Rhæcus, both natives of Samos."

It has been generally thought that their merit consisted in casting the statues with an inner core, which could afterward be removed, leaving the castings light, and, therefore, less costly. But this is open to question, as we have before seen from Assyrian bronzes having been found cast with an inner core of a date older than Theodorus and Rhæcus, and there is now in the British Museum an early Etruscan statuette from Sissa, on the Voltorno, with a core of iron.

The Samians were very early noted for their skill in this branch of art, and before the foundation of Cyrene, B. C. 630, they made a bronze vase ornamented with griffins, supported on three colossal figures of bronze, for the Temple of Juno.

The art was known at a very remote period in Italy. Among the Etruscans bronze statues were common before the foundation of Rome, 750 B. C., and Romulus is said to have placed a statue of himself, crowned by Victory, in a four-horsed car of bronze, in the new city. Pliny states that "King Numa Pompilius, the immediate successor of Romulus, founded a fraternity of brass founders and bronze workers."

By the Romans a compound was used under the name of *oncalchum* or *auricalchum*, which appears to have possessed the composition and properties of brass.

A brazen bull is traditionally said to have been contrived by Pericles at Athens for Phalaris, tyrant of Agrigento, 570 B. C. It had an opening in the side to admit the victims, and a fire was kindled underneath to roast them to death. The throat was so contrived as to make the groans of the victims resemble the roaring of a bull. The artist was made the first experiment, and the tyrant for whom it was made was roasted in it 549 B. C.

The oldest seat of bronze founding to any extent was the island of Delos, and next to that the island of Ægina. Between these two there existed a rivalry in the times of Myron and Polykleitos, of whom the former used the bronze of Delos, the latter that of Ægina. More celebrated than either was the bronze of Corinth, about which it is said "that when Lucius Mummius burnt Corinth, 146 B. C., all the metals in the city melted during the conflagration, and, running together, formed the valuable composition called Corinthian brass. This is exceedingly doubtful, but there may be a spice of truth in it, as long before this period the Corinthian artists had obtained great credit for their method of combining copper with gold and silver. Pliny says of it: "It consisted of gold, silver and copper, and was considered more precious than silver, and little less valuable than gold." There were three kinds of it, varying in color from white to dark yellow.

Corinthian brass appears, for the most part, to have been used for the manufacture of drinking cups and ornamental utensils. The Syrian translation of the Bible says: "Hiram made the vessels for Solomon's Temple of Corinthian brass." Pumps were invented by Ctesibus, of Alexandria, 224 B. C., and were wholly or partially of cast brass or bronze. The most distinguished colossal statue of ancient time was the Colossus of Rhodes, one of the seven wonders of the world. In the days of its prosperity the capital of the island of Rhodes was adorned with over 3000 statues, but this one exceeded them all. It was erected at the port of Rhodes, in honor of the sun, by Chares of Lindus, a disciple of Lysippus, 290 or 288 B. C., out of the spoils which Demetrius left behind him when he raised the siege of the city.

It is asserted to have spanned the entrance to the harbor of the island, and to have admitted the passage of vessels in full sail between its widespread legs. Its height was about 105 feet, the time taken for its construction was twelve years, and the cost amounted to 300 talents—about £70,000.

This stupendous work was thrown down by an earthquake about 224 B. C., and for nearly nine centuries lay in ruins on the ground. Pliny says: "It was a wonder to behold. Few persons could embrace the thumbs, and the fingers were longer than the bodies of most statues. Through the fractures were seen large cavities, into which large stones had been placed to balance it while standing." After the fall of the Roman Empire, when the island of Rhodes was conquered by the general-in-chief of the Caliph Othman, he sold the metal lying on the ground, weighing 720,000 pounds, to a Jew, who loaded 980 camels in transporting it to Alexandria.

A statue of Zeus, executed at Tarentum, 356 B. C., by Lysippus (the master of the maker of the Colossus of Rhodes), was 40 cubits high, and though it could be moved by a touch of the hand, yet resisted the force of storms by a support at the point of greatest stress.

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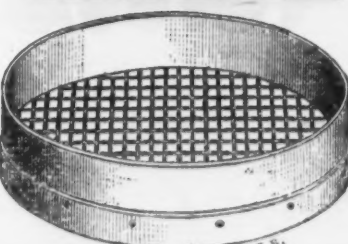
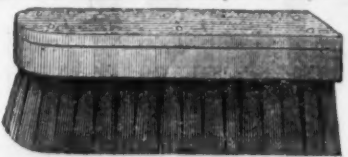
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CHAINS.

a State, cities such as Athens and Delphos
having some thousands each.Of the vast number made by the ancient
sculptors nothing but a few fragments
remain; but if the colossal head of Venus
in the British Museum be taken as a typical
example, it will show with what thinness
and fineness the figures were cast. Or,
again, as an instance of the quality of
Greek bronze, the figure of Siris, also in the
British Museum, on which a plate of bronze
will be seen beaten out till it reaches the
thinness of note paper.But if the larger works fail, there is an
abundance of statuettes, candelabra, mir-
rors, cests and vessels of all kinds, Greek,
Roman and Etruscan.Works in relief (*reliefs*), whether beaten
out, chased or cast, are comparatively
rare, though this branch of the art was
practiced by the greatest sculptors. The
Temple of Athene Chalkoites, in Sparta, had
its walls covered with bronze reliefs, but this
was an exception to the general rule adopted
in the temple decoration.The greater number of mirrors that exist
are Etruscan; a few may be Roman and
Greek. But the general rule of their being
Etruscan reminds us of the reputation the
Etruscans had for the production of works
in bronze—not, perhaps, of high art, but
what may be more correctly termed "indus-
trial art."They were also celebrated for modeling in
clay, and this, according to Pliny, "was the
stage of art which immediately preceded
casting in bronze, and went hand in hand
with it."The mirrors give the finest examples of
patina which we find; in the alloy there
seems to have been mixed a considerable
quantity of silver in order to obtain a highly
reflecting surface.For articles of furniture the Romans
employed Greek artists and workmen. In
bronze were made the sella, square seats
carried about at Roman entertainments;
also footstools.In the excavations made at Pompeii and
Herculaneum, various works of bronze are
found, showing the general adaptation made
of bronze by the Romans.In the theater are *bissellii*, or chairs of
state, made of bronze and ornamented with
silver, for persons of distinction and mun-
icipal authorities.In the tepidarium of the baths are bronze
benches, 6 feet by 1 foot, supported by four
legs, terminating in the cloven hoofs of the
cow, and ornamented at the upper end with
heads of the same animal. In the same
baths, a brazier of bronze, 7 feet 6 inches by
2 feet 6 inches, supported on cast bronze
legs, representing winged sphinxes, terminat-
ing in lions paws. In one of the shops a
bronze urn, evidently used for making warm
decoctions, and similar to the muller now in
use; a bronze mold for making pastry and
a pair of scales—articles of these kinds in
addition to the large number of statues and
ornamental articles.In all the bronzes from Pompeii and Her-
culaneum, the blue color of the patina is
very brilliant, although in other bronzes it
is more generally some shade of green. This
arises from their lying so long in the earth.
A difference of soil probably makes a differ-
ent patina, but something is also due to vari-
eties in the alloy.Greek seats (*throne*) are sculptured on the
Parthenon frieze, and sumptuous Greek fur-
niture during the last two centuries B. C.
was made of bronze, damascened with gold
and silver. It does not appear that the
process of gilding bronze was carried to any
extent in classical times, except in the pro-
duction of finger rings, of which a consider-
able number remain.During the excavations made in the palace
of Tiberius at Capri, the bronze cock of a
reservoir was discovered. As there were
conduits of water, and pipes necessarily con-
veying it to the baths, the knowledge of
cock making must have been known and
practiced, of which this discovery gives a
practical proof.By the time of the Byzantine Empire the
power of modeling seems to have declined,
and a taste for glittering appearance took
its place, and hence the process of orna-
menting bronze with reliefs was superseded
by inlaying it with silver and other ma-
terials.The art of bronze casting, which had thus
sunk during the Byzantine period, was
revived with great vigor in Germany in the
eleventh century, and there used for the orna-
mentation of gates and doors of public
buildings; notable instances being the bronze
gates of the Cathedral of Hildesheim, A. D.
1015, and the column decorated with reliefs
on the model of the Trajan Column at Rome,
A. D. 1022.In the twelfth century the art spread
southward to Italy, and was at first taken
up energetically in lower Italy. But
though many interesting works of this
date exist—and also from the thirteenth
and fourteenth centuries—it was not until
the fifteenth century that the art obtained
its full mastery. Then the revival of classi-
cal art became a real revival under the
Florentine artists. Andrea Pisano had
made a bronze gate in the Gothic style for
the Baptistry of St. John at Florence, 1330
A. D., and in 1401 A. D. the Florentine
Council decided to erect another. A com-
petition of artists for the work resulted in
the selection of Lorenzo Ghiberti. The con-
tract was entered into with him and his
father November 23, 1403 A. D., and the
gates completed and fixed April 24, 1424
A. D. They are truly a magnificent piece
of art workmanship, remarkable in several
respects as specimens of figure and orna-
mental modeling of the greatest possible
excellence, and which have formed the
models in this style for artists of all the fol-
lowing years, and of metal casting which
cannot be surpassed.The subjects of the 28 panels of the gates
are from the life of Christ.On January 2, 1424 A. D., Ghiberti re-
ceived the commission for the second pair of
gates for the same building, and these, con-
taining subjects from the Old Testament,
were completed and fixed June 19, 1424
A. D. The Martinengo Tomb in Brescia,
erected about the year 1530 A. D. to Mar-
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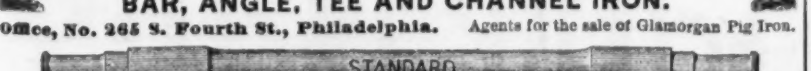
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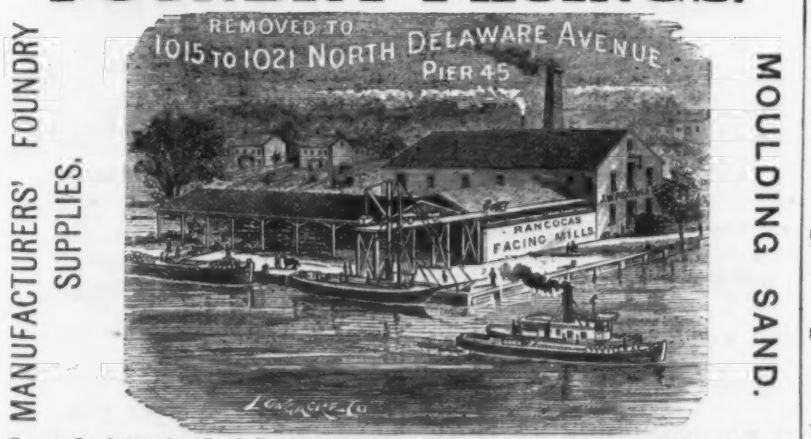
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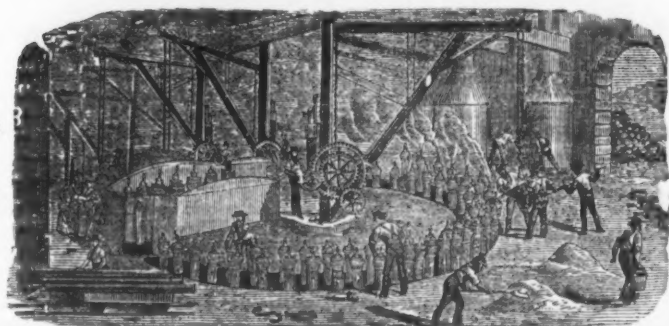
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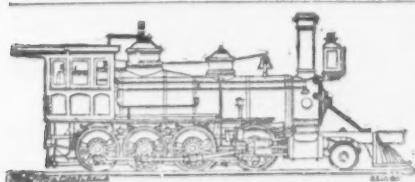
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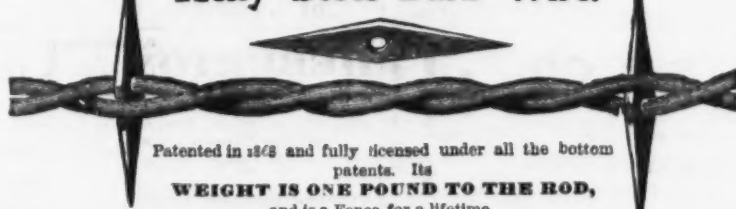
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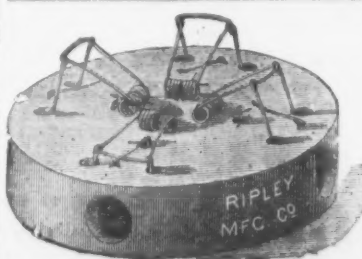
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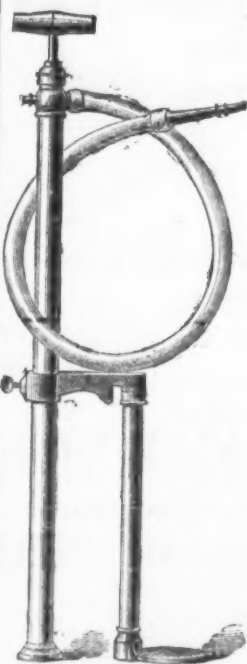
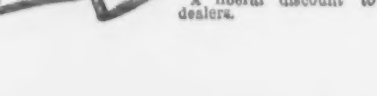
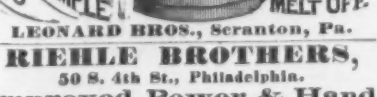
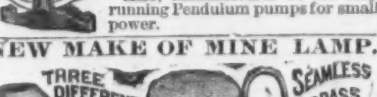
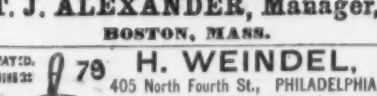
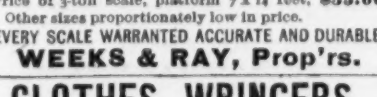
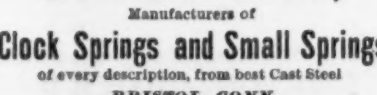
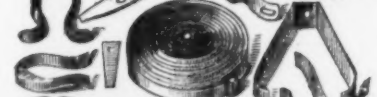
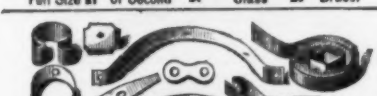
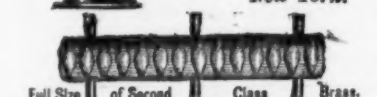
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Wires on both classes fastened without solder. The cheapest and most saleable in market.

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The above cuts (Fig. 250) represent our **PATENT AQUAPULT**, so valuable a Hand Force Pump that certain competitors have made bold to infringe on same, and even to resort to the crime of plagiarism in using our cuts and trade-mark name of article to decoy customers away from our manufacture and invention; and we caution the trade and customers against purchasing this article when not made by ourselves, as we intend to protect our rights under our patent.**WE ARE THE ORIGINAL AND FIRST INVENTORS OF THIS STYLE OF PUMP, AND HOLD VALID LETTERS PATENT ON SAME, AND ANY STATEMENT THAT IT HAD BEEN IN THE MARKET PREVIOUS TO OUR MANUFACTURE OF SAME IS OF COURSE ABSURD AND WITHOUT THE SLIGHTEST FOUNDATION IN TRUTH.****W. & B. DOUGLAS, Middletown, Conn.**

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Fig. 114.

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Single and Double Acting Spring Hinges,
Union Coil Door Springs,
Galvanized Pump Chain,
Patent Rubber Buckets,
Wooden Well Curbs, Wood Tubing,
Iron and Brass Pumps,
Patent Copper Pumps,
Hydraulic Rams, Power Pumps,
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Made of brass. Is very light, and works extremely easy. Write us for prices.

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MAGNETIC IRON ORE. THE ALL IRON MINES.

Capacity, 100,000 Tons per Annum.

These mines are situated in Putnam County, near Brewster, N. Y., and are in the vicinity of the "Tilly Forster" mine, which formerly belonged to the same parties. These mines are now sufficiently developed to show a uniform quality of ore, the openings being a tunnel in the mountain of about 200 feet in length and 200 feet above tide-water level. The following analysis of the ore was made by Prof. Thos. M. Brown, of Easton, Pa.:

ANALYSIS.	
Mag. Oxide of Iron.....	75.65
Protoxide of Iron.....	.83
Manganese Oxide.....	.09
Alumina.....	4.43
Lime.....	1.52
Magnesia.....	.97
Silica.....	14.89
Phosphoric Acid.....	.37
Sulphur.....	.40
Titanic acid.....	.27
Total.....	99.44

We propose to offer the above F. O. B. at Port Morris, N. Y., guaranteed 50 per cent. Metallic Iron.

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Brewster, Putnam County, N. Y.

profane history, and a triumphant procession in bronze adorns the principal frieze.

This development of taste extended to Naples, Rome, Milan and Venice. Even Raphael designed ornaments for the molders of purest taste and most exquisite fancy. In the sixteenth century it is found carried on with extraordinary skill in Germany at Nuremberg, Augsburg, Munich and Coburg.

In France also we find the art gaining importance, as may be seen from the bas-reliefs in the Chateau d'Anet, the residence of Diana of Poitiers, which was restored under Philibert de Lorme, 1547-8 A. D., and the monument erected to the memory of Charles VIII, 1499 A. D., around which were figures of the Virtues, executed in gilt bronze. Since then the art of sculpture in bronze may be said to have reverted to nearly its original limits, namely, the production of statues and groups in the round.

In 1699 a bronze equestrian statue of Louis XIV was erected in the Place Vendome, Paris. This was of gigantic size, containing 60,000 pounds of bronze. It was demolished during one of the revolutions, 1792 A. D.

The wood furniture during the Renaissance period was decorated and inlaid with brass and bronze. In the eighteenth century we find Ciseleurs mentioned as makers of such brass edgings for furniture.

Perhaps the grandest bronze work of modern times is the colossal statue of Bavaria, completed and inaugurated at Munich, Oct. 3, 1850. This statue was, at the suggestion of King Ludwig, designed by Schwanthaler, the sculptor, and his friend, Lazarini, who modeled the figure under his direction. For the casting it was necessary to melt 20 tons of bronze, a most perilous labor. To give some tangible idea of the size of the figure, in the head or upper part of the bust twenty-five men have found room, in the central part of the figure thirty-five to 40 persons could dine, and the space of ground covered by the lower section is enormous in proportion. The figure of this colossal maiden, with the lion by her side, is 54 feet in height—nearly twice the height of the equestrian statue of Wellington, opposite Hyde Park corner, London, England.

Wehrum, the architect, to secure as much air as possible. To that end the cupolas and converters and ingot pit will be so placed that an uninterrupted current of fresh air can always be secured. The buildings are so arranged that the product of the converters will move in a straight line toward the stock yard in all its operations. The rail mill is being rapidly pushed to completion, as indeed is every department of the works. As soon as the necessary filling has been put in and the buildings under roof, the machinery will be put in. All the machinery of the works is to be made after designs furnished by the architect of the company and is under contract, some of it in this city and the balance elsewhere. In this machinery the large experience of the president of the company has been taken advantage of, supplemented by the judgment of the architect, and the prediction of steel workers is that the Scranton Steel Company will have one of the most convenient institutions of the kind in the country.

Flanging Boiler Heads.—The *Locomotive* says: The study of the causes and nature of the defect known as grooving, as well as the character and appearance of the fractures which frequently occur in the flanges of heads or tube sheets and other parts of boilers where flanging is done, leads to the conclusion that flanges, as ordinarily turned, are very much too sharp, or turned to too short a radius. The evil effect upon iron of bending it too sharply may be shown by a diagram which represents a full size section of a tube sheet at the angle or flange, bent to a radius equal to about the thickness of the plate, as frequently found in practice. Indeed the sheets are frequently found with a still shorter bend, sometimes almost a sharp corner on the inside. The effect of this is to unduly strain the iron, both on the outside and inside of the flange, the outside being under a combined tensile and bending strain generally to such an extent that a section of the flange shows a laminated appearance, caused by the layers of the plate**Improved Shear for Bar and Round Iron.**

Our illustration shows a very powerful shear for all sorts of bar or round iron, built by the Peerless Punch and Shear Company, 115 Liberty street, New York. It is very simple, while its great power makes it a very desirable tool wherever there is any amount of cutting to be done. With one man on the lever, it will easily cut off 1/4-inch iron 2 inches wide at a single cut.



IMPROVED SHEAR FOR BAR AND ROUND IRON.

This size will also handle 1-inch round iron 3/4 x 3 inches, or 1/2 x 4 inch flat iron. The largest size weighs 375 pounds. There are three sizes, and the smallest cuts iron up to 3/4 x 2 inches or its equivalent. The manufacturers have recently been making some experiments in the relative time it takes to cut iron on the anvil in the old way and with the shear. The test was made with 1 1/4 bar iron 3/4 inch thick, and 44 pieces were cut off in an hour and five minutes, which, we should judge, was fair average work, being less than 1 1/2 minutes to each cut. With the shear 46 pieces were cut from the same iron in 6 minutes. From the figures it is easy to calculate the saving to be made if any considerable amount of cutting is to be done.

Extra jaws come for round iron when much of it is to be cut. The press is adjustable for different thicknesses of iron, and when heavier cuts are taken the handle is lengthened by means of an extra length fitted for the purpose. The press seems to meet a decided want, and we judge it will be very satisfactory in its operation.

The New Bessemer Plant at Scranton.The Scranton (Pa.) *Republican* reports 350 men employed by the new Scranton Steel Company in the erection of their works—a number in the quarries, but the great body on the flats above the Sauquoit Silk Mill. Though practically but five weeks' work have now been expended on the site selected, the labor accomplished is most surprising. The foundations for the rail mill have been laid and about 100 feet ready for the roof; the foundry and machine shop are lacking but two weeks' work to be ready for the rafters, and the steel mill foundation is nearly ready to be laid, the foundations for the cupolas being already laid in concrete. A most surprising amount of work has been accomplished in a brief space of time, and though there are over 300 men actually employed in digging trenches, framing timbers, preparing concrete, piling up stone wall and filling in for the railway switch extension, everything is quiet as a graveyard—no noise, no confusion, but perfect system everywhere, the president of the company, Mr. Scranton, having the rare faculty of picking out the right sort of men.

The foundry and machine shop are built of stone, and not of brick, as at first proposed, and will be substantial structures. They are on a line with one another and are about 100 feet apart. The rail mill will be separated from the steel mill by an extensive yard. The wisdom of this is to distribute the heat—the rail mill of itself being hot enough for all practical purposes. In the steel mill it is the purpose of Mr.

A Singular Use for Electricity.—Perhaps one of the queerest applications of electricity to the useful arts is its employment in the hiving of bees when they swarm. The old-fashioned way of accomplishing this interesting feat of domestic economy was, if not absolutely dangerous, at least quite annoying and provoking. German scientists of a practical disposition conceived the notion of utilizing the electric force to stupefy, without injuring, the bees for a short period. The plan was found to work like a charm. It was first tried upon bees that had gathered upon trees. Whether the clusters were large or small, the result was perfect. The bees fell upon the ground in a trance, which admitted of safe handling. The next stage in the experiment was to capture the bees when they were about to swarm. By introducing the ends of two conducting wires into a fully occupied honeycomb, and turning on the current for an instant, the insects were rendered inactive for about thirty minutes. Bee-rearing and the production of honey are yearly becoming a greater industry in this country. Parties interested in the business should test the German idea of hiving bees by electricity. The chance is not remote that bee proprietors will apply too strong a shock and lose their bees, but they will gain in science, which ameliorates all small disasters in this progressive age.

All the Erie wrecking trains are to be supplied with cannon to bombard the tanks on burning oil trains, to prevent them from bursting. This plan saved much valuable property at Delaware Bridge, where seven tanks exploded before cannon could be procured; but 19 were saved after the oil had been drawn from two by shooting slugs into them.

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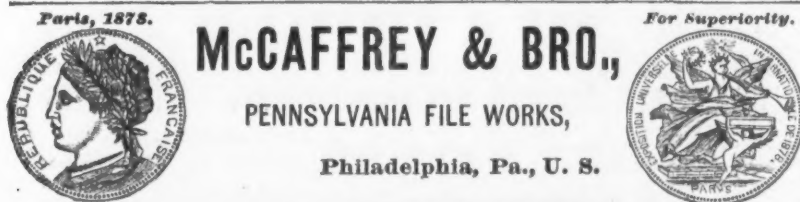
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Superiority acknowledged wherever used, sold or exhibited.

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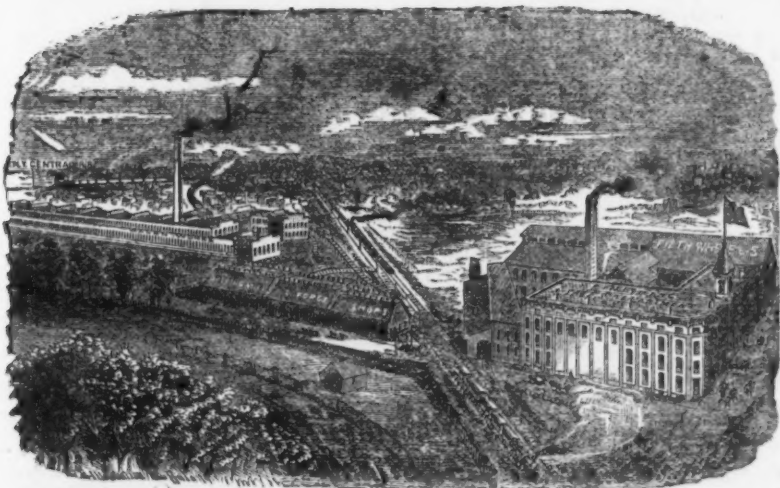
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Handsaw Taper, slim,
High Back,
Hook-Tooth,
Knife,
Knife Blunt,
Lead Float,
Lightning,
Machine Mill,
Mill,
Mill Blunt,
Mill Pointing,
Pillar,
Pitsaw,
Reaper,
Roller,
Round,
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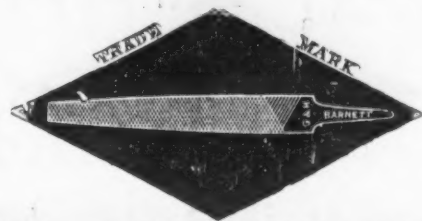
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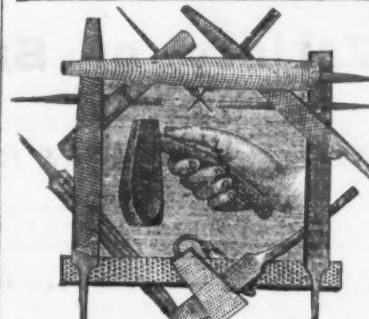
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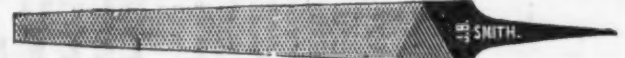
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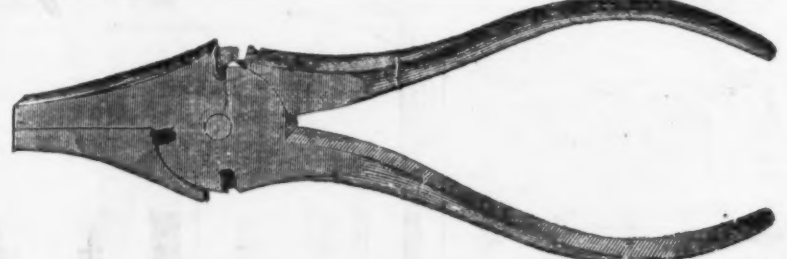
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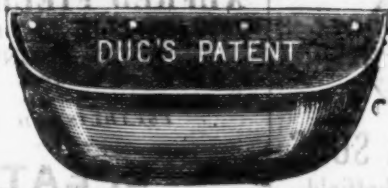
Any variations from the regular size or shape of the above-named goods made from sample to order.

A SILVER MEDAL has been awarded above goods at the Paris Exposition, being the only medal awarded any American manufacturer of Tacks and Wire Nails.

DUC'S PREMIUM ELEVATOR BUCKET.



ALWAYS FIRST
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This Bucket is struck out from the best charcoal iron; consequently is very durable. It requires 50 per cent. less power to run it than the old-fashioned square bucket, and will outwear half a dozen of them. Over 100,000 are now in use by the principal Millers, Brewers, Distillers and Manufacturers at home and abroad. It is the best Bucket made. CAUTION.—The popularity of the DUC BUCKET has caused many manufacturers of the old style of Elevator Buckets to closely imitate its spherical shape. We warn all parties against patronizing imitations of our patents, as they will be held accountable. Send for circular. Address

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We carry a large stock of the various sizes of *Tinners', Carriage, Wagon, Hame, Belt, Barrel, Safe and Tank Rivets*, and make promptly to order all sizes not larger than 7-16 inch diameter. We have a capacity of two tons of the various sizes of small Rivets per day of ten hours. Freight allowed to all points on or east of the Mississippi River. Correspondence with buyers solicited.

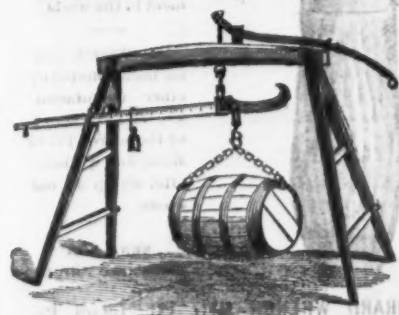
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Patent Balances,

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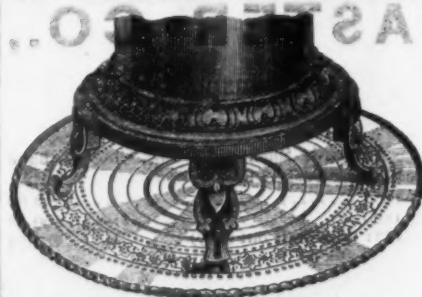
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27, 30, 32, 34, 36 inch.

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ESSEX HORSE NAILS.

Hot Forged, Warranted Best Quality, Pointed and Polished.

HOWE & CO., Troy, N. Y., Sole Agents.

INDUSTRIAL ITEMS.

MAINE.

The American Railroad Rail Joint Company has been formed at Portland for the purpose of buying and selling railroad joints, with a capital of \$500,000.

NEW HAMPSHIRE.

The Continental Construction Company, of Chicago, have purchased the old New Hampshire Prison property in Concord, which consists of a large machine shop and some other buildings, and propose to remove their works to that place. The company have been instrumental in starting a movement to utilize the extensive water power at Seval's Falls, at East Concord, about two miles from the city proper, and it is believed that the extent of this water power, the facility with which it can be utilized, its continuity to Concord, with the Northern and the Boston, Concord and Montreal railroads within a stone's throw on either side, need only to be known to attract capitalists from abroad and secure its transformation into a manufacturing center.

The Nashua Lock Company are making another addition of 100 by 20 feet. The company have also built a story over the engine-room, 20 by 40 feet, for plating department.

MASSACHUSETTS.

The Worcester Wire Works have shut down till the 1st of November, to allow an opportunity for the introduction of their new engine and a lot of other machinery necessary to their increased business. The engine has a capacity of about 500-horse power, and is from the Green Steam Engine Company, of Providence, from a model entirely new and different in many important features from anything yet turned out at the works. The cylinder is 26 x 45 inches, and the fly-wheel is 18 feet diameter and 37 1/2 inches face. A new Berkeley condenser is also to be put in. The increased power, it is expected, will enable the company to do more than double the work than by the old engine. Besides this, three new 80-horse power boilers have been introduced and more than 300 feet of new shafting. The latter will be connected with the engine and the new machine shop.

At Lawrence, E. McCabe & Co., boiler makers, are about to erect a new shop. They now employ 25 men. The Pacific Mills are using 45 boilers made by them.

The Phoenix Machine Co. have received the order from the Maginnis Cotton Mills, of New Orleans, La., for the entire outfit for their patent improved warpers. The Whitehead and Aberton Machine Co., of Lowell, are to furnish the entire picking machinery.

The rapidly increasing business of the Pairpoint Manufacturing Company, New Bedford, necessitates the immediate erection of a separate building for the manufacture of knives, forks and spoons. This addition is to be of brick, about 40 feet square, and situated to the westward of the engine house.

Business at the works of the Northampton Emery Wheel Company has increased so much that 10 new baking ovens are being constructed. The foreign trade is much larger than formerly, and three large orders have been received already this month from Germany. This trade takes in wheels all sizes, from 24-inch down to 1 inch in diameter.

RHODE ISLAND.

The Builders' Iron Foundry, Providence, is engaged in filling an order in iron bridge piers, 8 feet in diameter, and 10 1/2 feet in length, for the New Orleans and Pacific Railroad Company. The bridge is to span one of the tributaries of the Red River in Louisiana. Each piece weighs nine tons, and is trimmed and finished ready for setting up before leaving the foundry. The contract calls for 75 of these piers, about half of which have been forwarded to their destination, and the remainder will be sent before the first of December, the rate of supply being one a day. The establishment melt daily about 25 tons of ore. The Builders' is the only foundry in the city engaged in producing gun iron, and makes a specialty of air-furnace castings. The iron used in these castings is the finest quality of cold-blast charcoal iron. The concern is now under contract to supply a large quantity of this iron, which is guaranteed to have a tensile strength of 30,000 pounds per square inch. The average tensile strength of ordinary iron is from 12,000 to 15,000 pounds. Test samples are made with each casting and sent to Watertown arsenal for test on the government machine. The average of these pieces as tested is about 32,000 pounds.

CONNECTICUT.

At Tariffville the Hartford Cutlery Company closed their works on Friday, Oct. 7th. The company came to Tariffville over a year ago and engaged in the manufacture of glass handle table cutlery. Most of their work has been sold by the Union Knife Company of Naugatuck. A rumor states that the latter company is to buy the machinery and continue the manufacture of this style of cutlery.

Farist & Windsor's steel works, at Windsor Locks, are full of orders and crowded with work. They only do the rolling for the Leamers Morton process of making steel.

There was commenced (in Bridgeport, on Friday, a hearing in the suit of the Etna Spring and Axle Company, of Bridgeport, against Messrs. George Hopson, G. B. Waller, Samuel Wilmot and J. N. Bullock, all former officers of the company, to recover from them about \$250,000, which sum, it is alleged, they misappropriated through an improper and fraudulent administration of the axle company.

The Horton Chuck Company, of Windsor Locks, have taken an immense start, put in new machinery, and are driven with new orders.

DELAWARE.

The Wilmington Malleable Iron Co., of Wilmington, have bought out the business of Richard P. Pim, and will carry on the manufacture of malleable iron and gray-iron casting to order with largely increased facilities. Mr. R. P. Pim is president of the company, and James Bailey secretary and treasurer.

PENNSYLVANIA.

The Harrison Boiler Works, of Philadelphia, have recently shipped to the Brown & Sharpe Mfg. Co., of Providence, R. I., 150 horse-power of their boilers, being an addition to the boilers used by that firm for 10 years.

J. I. Dawson & Bro., Philadelphia, have removed from their old location to their new and enlarged foundry and machine buildings, Twenty-ninth street and Gray's Ferry Road. The new place will be known as the Gray's Ferry Iron Foundry Boiler and Machine Works. They will manufacture boilers and engines, loam, green and dry-sand castings, and their facilities will enable them to produce castings of a first-class quality up to 25 tons.

Thinius Olsen & Co., Philadelphia, were awarded the first premium for their testing machine at the Cincinnati Exhibition, and the jury, in recommending the award, stated that the construction and mode of operation give it points of superiority not contained in other testing machines which had come to their notice. The universal adjustable clamping wedges for securing a central pull of the specimen, as well as the improved system of screws and gears by which the strain is applied, being novel and well adapted for the purpose. The machine on exhibition was purchased by the Cincinnati Rolling Mill Company.

Philadelphia is rapidly gaining a hardware neighborhood in the vicinity of American street and Lehigh avenue. At this point the National Hardware and Malleable Iron Works of Thomas Devlin & Co. occupy space 250 by 250 feet, and have a foundry of 155 by 70 feet. They have a warehouse building of one story high fronting on Lehigh avenue, which is 120 by 40 feet. The company will make a specialty of malleable-iron steam, gas and water fittings, and also of cabinet, builders' and carriage hardware. We believe they intend to make steel castings to order. The American Machine Company have extensive works on the other side of the street, and within less than a Philadelphia block the J. Barton Smith File Company are putting up a large factory, the size of which we have not just now at hand. It is in this same neighborhood, or at least within half a mile, that the Enterprise Mfg. Co. have their works. This company has been very busy all the season, and we hear that the press of orders still continues. This district will, when all the works we have mentioned are in full operation, employ quite a little army of operatives.

The Northern Liberties Machine Works, Alfred Box & Co., of Philadelphia, have erected an entirely new building in order to secure better accommodation. It fronts 52 feet on Green street and 40 on Dillwyn street. It is a very substantial building, four stories high. The firm expect to be in full working order in November.

Messrs. Hammer & Tryon, solar photographers, No. 1617 Spring Garden street, Philadelphia, have completed a 36-inch solar photograph of the portable cylinder boring machine made and used by the L. B. Flanders Machine Works, of this city. The picture has been placed temporarily on exhibition at No. 925 Market street. This is a somewhat unusual size for a solar photograph of machinery.

The Tyson engine has been recently improved, and is now manufactured by the Coles Machine Tool and Steam Motor Co., Philadelphia. This company has fitted up new works at 1010 Hamilton street, and has a large number of orders waiting delivery. This engine, it will be remembered, is especially adapted for small powers, domestic work, &c.

The Southwark Foundry and Machine Co., Philadelphia, is still full of orders for the Porter-Allen engine. It is a noticeable fact that a large proportion of the orders of the present season have been from New England.

The large foundry of the Pennsylvania Railroad, at Altoona, has been put into operation.

The Philadelphia and Reading Railroad Company are unable to supply locomotives fast enough for their business, and the resources of their machine shops in Reading are very heavily taxed. A number of locomotives were supplied during the summer with new fire-boxes and flues. Four passenger locomotives left the shop within a week past, seven having been on the stocks at one time.

The Hollidaysburg Iron and Nail Company's rolling mill has closed down for repairs, after one of the longest continued runs ever made since the works have been built.

The forge at Howard is running day and night, making about 5 tons of A 1 charcoal bloom per week. The orders are coming in faster than they can be filled, so the prospects are good for the coming winter.

The Jefferson charcoal furnace, in Schuylkill County, was never in a better condition than now. It has been overhauled, a new iron stack built, and the product is from 37 to 40 tons of charcoal iron per week. The tract of land connected with the furnace numbers 3200 acres. The furnace now has on hand enough charcoal to run for a year. The farm to the furnace is in fine order.

Four thousand acres of coal lands on the line of the Pennsylvania Railroad near New Florence, Westmoreland County, are said to have been leased by Philadelphia capitalists at \$20 per acre. The whole is underlain with an 8-foot vein of coal which will be developed at once.

Charlotte Furnace at Scottsdale, and Fairchance Furnace above Uniontown, which were compelled to shut down during the recent severe drought, have resumed operations.

A correspondent writes regarding the furnaces of New Castle: "Of the seven blast furnaces in this city, the Etna No. 1, Etna No. 2, Little Pot, Clara, Rosina, Lucy and Neshaunock—only the Etna No. 2 and Little Pot are now in blast. This state of affairs will not last long, however, for the Neshaunock will blow in about November, Etna No. 1 in the course of five or six weeks, and the Clara about January 1. When the remaining two will resume operations, if ever, no man has yet made known."

Mt. Hickory furnace No. 1 at Sharpsville

Cutlery.

FRIEDMANN & LAUTERJUNG,

Manufacturers of
PEN AND POCKET CUTLERY,
Solid Steel Scissors, Shears, Razors, &c.
Sole proprietors of the renowned full concave
"ELECTRIC RAZORS,"
And the celebrated "ELECTRIC SHEARS." Nickel Plated
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Agents for the BENGALL RAZORS.
AMERICAN TABLE CUTLERY, BUTCHER KNIVES, &c.
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Superior Cutlery of all kinds and grades, from the finest in pearl and ivory handles to the lowest price in wood and iron handles.

OUR BUTCHERS' and HUNTERS' KNIVES
Are warranted to be equal in style, finish and quality, to any goods made in the world.
"COMPARE, THEN JUDGE."

We are the sole owners of the Gardner Patent Guard and Rest for Carving Forks, and the manufacture of fine carvers is with us a specialty.

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CUSHION BELT
OUR NEW PATENT
COMBINATION RAZOR STROP.
J. R. TORREY,
MANUFACTURER OF
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In all Styles.
J. R. TORREY RAZOR CO.,
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To introduce we offer HOLLOW GROUND RAZORS at \$1.50, \$1.75, \$2; Ivory, \$2.50. Our SWEDISH GEM RAZORS, \$1.75, \$2, \$2.50; Ivory, \$3. All our own make, and warranted the best cutters in the world. As razor makers we know what is needed to sharpen a dull razor, and will mail for 75 cts. a razor warranted to set a fine edge to any razor. If in Morocco case \$1.
Factories at WORCESTER, MASS. Catalogues to the trade.

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FOUR PEPPERCORNS AND A DIAMOND.
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CORPORATION OF CUTLERS OF SHEFFIELD
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REGISTERED ALSO AT
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BUTCHERS' KNIVES,
BUTCHERS' STEELS,
AND
SHOE KNIVES.
It having come to the knowledge of
JOHN WILSON that Counterfeit Butchers'
Knives, purporting to be of his manufacture,
are being sold in the United States, he hereby
cautions all purchasers of his Knives and
Steels to be on the alert against such im-
position.

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that it is his determination to institute Legal
Proceedings against any person or persons who
may be detected infringing his Trade Mark.
Every article of JOHN WILSON'S man-
ufacture, bears the Trade Mark, in addition to
the Name.

WORKS: SYCAMORE ST., SHEFFIELD, ENGLAND. Established 1750.

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Every Pair Warranted.
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FRANCIS T. WITTE, KING, BRIGGS & CO.,
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HARDWARE, CUTLERY & GUNS.

CASH BUYERS ARE INVITED TO SEND FOR
ILLUSTRATED NET CASH PRICE LIST.
No Complicated
Discounts.
Net Cash. No Discount.
Special attention
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Proprietor of "H. & J. W. KING'S" POCKET KNIVES, RAZORS AND SHEARS.

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No. 1.—This well known instrument has now
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acknowledged to be by far the best and therefore
the cheapest in the market.
It has been known to clip between 200 and 300
horses before requiring sharpening.

W. Clark's Patent Clipper No. 2
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To be obtained of all Saddlers and Ironmongers.
Wholesale of the Patentee,
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Please notice that we have removed from No. 295 THIRD AVENUE to
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Where we hope to be favored with a continuance of your generous patronage.
J. M. FARRINGTON & CO.,
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LOCKS, KNOBS, GONGS, BLANK KEYS,
Wrought Store Door and Flush Bolts, Silver Plated, Ornamental Bronze and other Hardware.

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(LIMITED)
CELEBRATED CUTLERY,
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The demand for Joseph Rodgers & Sons'
productions having considerably increased, they
have, in order to meet it, greatly extended their
Manufacturing Premises and Steam power.
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The strongest Wrench made, and the only suc-
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Wrought Bar, Head
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Owing to the in-
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Popular Wrenches,
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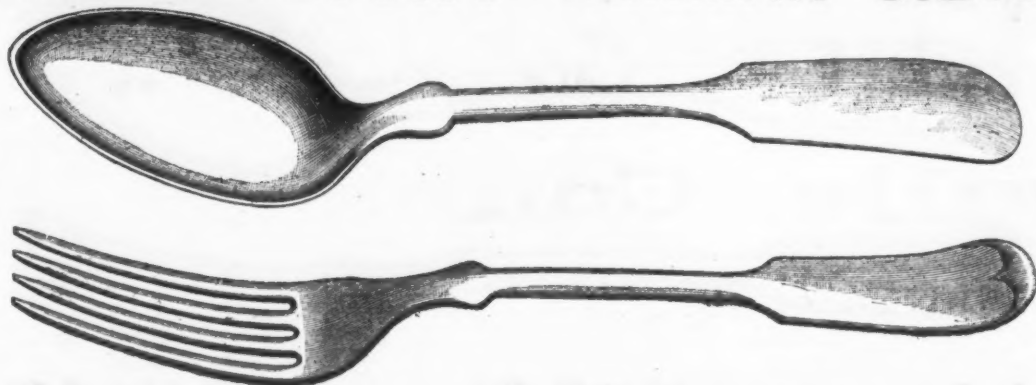
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PATENTED."" JAPANESE
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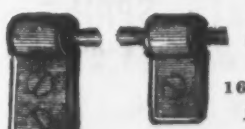


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Phosphor-bronze is daily gaining favor with manufacturers who have to use a metal of great toughness and durability, of fine grain, high tensile strength and ductility, and is acknowledged far superior to any other alloy on account of the readiness with which it takes a polish, its elasticity, fluidity and beauty of color. Its high price, however, has so far prevented the use of it to so large an extent as its merit would warrant. For the first time an article is offered herewith which makes it easy for everybody to manufacture his own Phosphor-bronze of the grade it is wanted, by the simple process of melting. This article is **PHOSPHOR-TIN**. By melting a very small quantity of it with copper an excellent Phosphor-bronze is obtained at a much cheaper price than the ready made Phosphor-bronze can be had in the market. A trial ought to be made by everybody who is using it.

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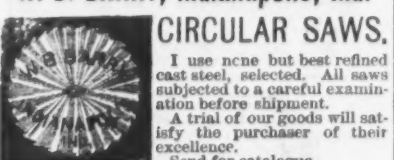
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Hardware & Metal Broker,

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MANUFACTURERS' AGENT,

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Representing in the Dominion of Canada several American Manufacturers, is ready to accept further Agencies. Satisfactory references.

has to clean the hot blasts and make a few repairs, which will take several days.

All the iron foundries and machine shops in Scranton are busy on machinery for the Scranton steel mill.

The shipments of slate from Slatington and vicinity for the week ending Saturday, Oct. 15, were as follows: Roofing slate, 2326 squares; school slate, 351 cases; mantels, 3 cases and 345 pieces; blackboards, 55 cases; flagging, 26 cases and 577 pieces. The slate trade continues in an excellent condition.

The Easton Lock Works, which were about to remove from that locality on account of high rents and taxes, have been offered a lot of ground, as a present, to build on if they remain.

The rolling mill at Beaver Falls, which has been idle for several months, resumed work on Monday last. The steel works, which were almost totally destroyed by fire eight weeks ago, are again in operation. The hinge and barbed wire factory, burned at the same time, is also again in operation. The file works, shovel works, glass works, planing mills, the cutlery works, and in fact every branch of industry, are all doing a lively business.

A dispatch from Philadelphia says that the gross receipts of the Philadelphia and Reading Railroad and Coal and Iron Company for the month of September were \$3,356,411.57; expenses, including interest, \$2,227,592.55; net earnings, \$1,128,819.02, being a decrease for the month as compared with the corresponding month last year of \$303,323.55. The profits of both companies for the year to date are \$8,063,677.16, being an increase of \$1,070,953.54, as compared with the corresponding period last year.

The Reading Hardware Company are making 150 stoves a day.

Roland Furnace, at Mill Hall, Clinton County, commenced operations last week.

The Kittanning Iron Co. will soon blow out their Rebecca Furnace for repairs.

To supply additional blast to their converters, the Lackawanna Iron and Coal Company have just erected and put in operation at their steel works an additional horizontal blowing engine, larger, though similar in type to the two already there. This engine was made by the Dickson Mfg. Co., and is an unusually fine piece of workmanship. The steam cylinder is 60 inch diameter and 60-inch stroke, and the blowing cylinder 54 inch diameter and 60-inch stroke. This engine was ordered by Mr. Scranton, the Iron Company's late general manager, some time before his resignation, and though in operation but a short time, seems to more than answer the expectations formed of it in diminishing the time of blowing heats, and thereby increasing the capacity of the works. The company have also about ready for operation a horizontal engine, 30 inch diameter and 36-inch stroke, for driving their cupola blowers, and have ordered additional engines for their blast furnaces.

Messrs. Hummel, Fendrich & Co. have taken possession of the old Novelty Iron Works in Harrisburg, and have started them up as the Harrisburg Steel and Iron Works, having thoroughly repaired, refitted and extended them. Their business is the manufacturing of merchant bar, iron and steel; horse and mule shoe steel and iron; square, oval and round iron; tire steel and iron; toe calks, steel and iron and other mercantile material in the line. The firm will make a specialty of the manufacturing of Mr. E. B. Edwards' patent iron, or semi-steel, an iron that will stand a tensile strain of from 63,000 to 65,000 pounds to the square inch. A test of this iron was made by the United States naval inspectors with a successful result of 63,000 pounds tensile strength. The works employ 65 men, and have a capacity of from 4000 to 5000 tons of iron per annum.

Messrs. Brown & Co., of the Wayne Iron and Steel Works, have leased for a short time the sheet mill of the Eagle Rolling Mill, now owned by J. W. Friend & Co.

Charles F. Brush, of the Brush Electric Light Company, last week filed a bill in equity in the United States Circuit Court against the Siemens-Anderson Steel Company and Robert J. Anderson. The bill shows that the plaintiffs own the patents on the Brush electric light, and claims that the defendants' company make and use large quantities of electric lamps in violation of the plaintiffs' patent, and an injunction is asked for. This is probably the beginning of considerable litigation. The Weston and the Fuller electric lamps are claimed by the Brush people to be an infringement on their patent. All these lamps are constructed on the same principle, except that Brush was the first to use copper coating on the carbon points, and he especially says that this device has been infringed on by the Weston lamp, and also that the Weston lamp uses an annular clamp which is covered by Brush patents. The defendant company merely use the Weston lamps.

The eastern wing of Minnemeyer's malleable iron works, Allegheny, was badly damaged by fire last week. The principal loss was by the destruction of two large annealing furnaces and the damage by water. The loss will not exceed \$3000, fully covered by insurance.

Five hundred and nineteen kegs of spikes were turned out, Thursday last, at Dilworth, Porter & Co.'s spike mill. It was the largest day's work ever done at the mill.

A large 25-ton anvil block has been delivered to the Siemens-Anderson Steel Company by the Atlas Works. A 16-ton anvil is to follow.

The interest of the late James E. Brown in the Kittanning Iron Company has been sold to John Graff, of the firm of Graff, Bennett & Co.

The new repair shops of the Pennsylvania Railroad at Torrington Station will occupy about an acre of ground in the rear of the present branch shop. It is expected that the new shops will be ready to commence operations with the beginning of next year. They will employ about 200 men.

Low Moor Furnace is averaging 100 tons a day.

Ferrol Furnace, owned by the Pennsylvania and Virginia Coal and Iron Company,

has been leased to Eastern capitalists at an annual rental of \$60,000, so says the *Virginian*.

OHIO.

The Plate Glass Works at Massillon will probably employ about 100 men when started. They will also have a bottle department.

The Lane & Woodworth Patent Glass Roofing Company, Youngstown, have a force of men engaged for the foundations for their buildings north of the Valley Mills.

The Belfont Iron Works Company, at Ironton, will probably add 20 nail machines to their works this winter, increasing their complement to 100. This will necessitate several additional puddling furnaces.

Another new 10-pot glass works is in contemplation at Etnaville. Ground will be broken this week.

The Hubbard Rolling Mill was running double turn all last week.

Tiltonville is to have a glass works, notwithstanding reports to the contrary. Masons have almost completed the foundation, and it is expected the enterprise will be in operation by January 1. The works are being erected on the line of the Cleveland and Pittsburgh Railroad, just above Tiltonville. It is to be a large 10-pot furnace, affording facilities for manufacturing all kinds of flint glassware. It is a joint stock concern, Wheeling, Martin's Ferry and Bellaire parties being the stockholders.—*Cleveland Trade Review*.

The Pennsylvania Iron and Steel Company, of Canal Dover, capital stock \$200,000, was incorporated last week to build iron works at that place.

A charter has been obtained for the Bellaire Bottle Works, to be located in Bellaire. The capital is to be \$50,000. The stock will soon be raised and the building of the works begun.

Means, Kyle & Co. will probably let the Ohio Furnace remain idle next year, owing to the distance they have to haul charcoal.

Todd & Co., at Youngstown, are building three large presses, weighing 10 tons each, for straightening steel rails. They are to go to Colorado.

ILLINOIS.

The Chicago Department of Public Works opened bids on the 20th inst. for large quantities of special castings and cast-iron water pipe, to be used in the street improvements now in progress. The Union Foundry Works and J. H. Bass offered to supply the special castings for cast-iron water pipe at \$52 and \$57 per ton respectively. For the hydrants and stop-valve castings the Union Foundry Works sent in a bid of \$64 per ton, and J. A. Bass \$60 per ton. The following were the bidders for 1000 tons of cast-iron water pipe: Lake Shore Foundry, \$43.50 per ton; A. H. McNeil, \$43.95; Dennis Long & Co., \$43.80; Cincinnati and Newport Co., \$43.94; R. D. Wood & Co., \$43.83; Schickel, Harrison & Co., \$45.

Rogers, Brown & Co., of Cincinnati, O., announce that they have established a branch pig-iron commission house in Chicago, to be known as Rogers & Brown, with Mr. Geo. Fetter, late of Geo. G. Fetter & Co., Louisville, as manager. The business, having the advantage of the connections of Rogers, Brown & Co., of Cincinnati, will be an independent local house, dealing with furnaces and consumers directly. It begins with the sales agency of thirty or more of the leading furnaces of Ohio, the Southern States and the East. The office is at 88 Dearborn street.

The main building of the Willard Sons & Bell Co., new steam forge at South Chicago, is nearly completed. Its size is 251 x 60 feet; it will contain 10 steam hammers and as many furnaces. In addition to that building there will be a machine shop 30 x 60 feet, and a "scrap house" 40 x 40, and still another for puddling furnace and rollers, 60 x 60. One of the furnaces and steam hammers will start in a few days.

The Calumet Iron and Steel Company, of Ironton, having just completed 12 nail machines for their works, are adding three more, making 90 in all.

Chas. F. Elmes, manufacturer of mining and general machinery, is building four Willard helve steam hammers for the Pullman Palace Car Company, Pullman, and one for the Willard, Sons & Bell Co.'s new works at South Chicago.

The Roger's Foundry Co., of Belleville, has been incorporated with a capital of \$25,000 and Robert Eddy and Geo. W. Roberts are the incorporators.

Holmes, Fyott & Co., of Chicago, employ in their iron works 120 men and melt 14 tons of iron a day.

Work has commenced at the F. H. Manny Agricultural Implement manufactory, which removed from Rockford to Waukegan last summer.

INDIANA.

The Atlas Engine Works, Indianapolis, are building two Corliss engines, to be placed in the new St. Paul shops of the C. St. P. M. & C. R. R. One of these engines is 100-horse power, and the other 150. The works have an order from Gaff, Gent & Thomas, Columbus, Ind., for an 80-horse-power Corliss engine. The works were awarded, at the Ninth Cincinnati Industrial Exposition, a gold medal for the best slide-valve engine shown. This, we believe, was a first premium.

KENTUCKY.

Every department of the Norton Iron Works, Ashland, has been in full blast during the past week, and working satisfactorily. The furnace has been making an average of about 50 tons of superior iron per day. The nail factory has turned out 4151 kegs of nails.

Ashland Furnace made during the last week a daily average of 57 tons of good iron, using all raw coal for fuel.

MICHIGAN.

The following table from the Marquette Mining Journal exhibits, in gross tons, the total lake shipments of iron ore the present season, up to and including October 12, together with the amount shipped during the corresponding period last year:

Where from.	1880.	1881.
Escanaba.....	924,454	1,179,519
Marquette.....	502,400	596,450
L'Anse.....	46,893	45,158
Total.....	1,503,783	1,831,153

An increase of 227,370 gross tons. The biggest week's work ever done at the

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Manufacturers of the

BEST QUALITY CARRIAGE MAKERS' HARDWARE.

Manufacture the Largest Variety of Forged Carriage Irons of Best Material and Workmanship.

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The Saranac Nails are hammered hot and the finishing and pointing are done cold. Quality is fully guaranteed. For sale by all leading iron and hardware houses.

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W. S. GUIBORD, Secretary.

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36 Oliver Street, Boston. S. H. & E. Y. MOORE, Gen'l Agents for Western States, 163 and 165 Lake Street, Chicago, Ill.

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Cal., Short or Long Cylinder.

Wood, Rubber Ivory and Pearl Handles.

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Round or Octagon Barrels.

Plain Finish, Engraved or Enameled.

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32 Cal. Long Fluted Cylinder.

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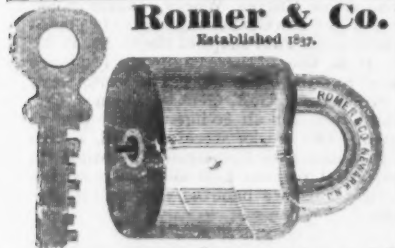
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Malleable Iron and

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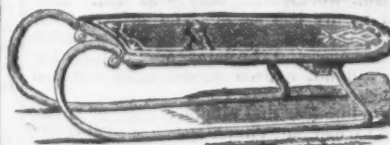
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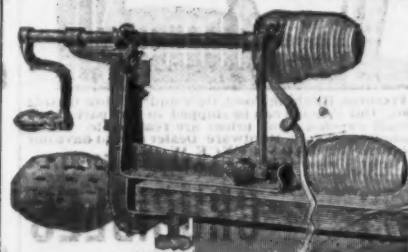
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Patent Applied For.



The White Mountain Potato Parer is the only machine ever made that will not only pare a potato much better than it can be done by hand, taking off a thinner paring from every shape or kind of potato, but will go into and clean out the eyes, and altogether at a saving of at least 20 per cent. It is free from the objections made to the old style of rattler, geared parers; is solid and substantial, cannot get out of order, and so cheap as to be within the means of everybody. Almost any of the Potato Parers in the market seem as if they might do the work better "next time," but the "White Mountain" DOES IT NOW. Every Machine warranted as represented.

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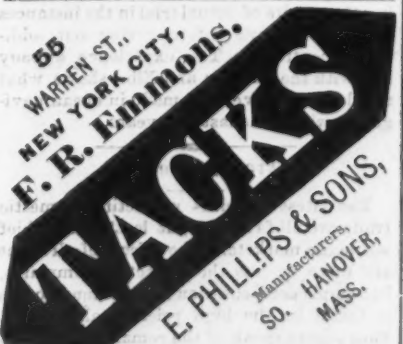
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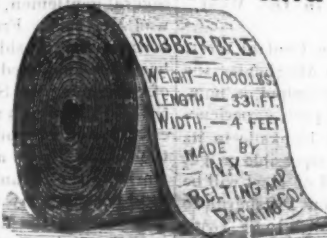
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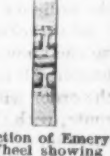


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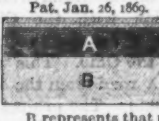
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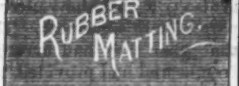
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Send for Pamphlet and Price Lists.

PHOSPHOR-BRONZE.

Deer Lake Furnace was that of last week, when 105½ tons of iron were made on an average of 104 bushels of coal. The furnace has been in blast one year, and has turned out something over 8000 tons of pig metal. Some persons think it doubtful whether there is another 8-foot bosh in the country that can show an equally good record.

MISSOURI.

The Union Machine Shops, of St. Louis, are being considerably enlarged by the addition of a two-story brick building, in which additional machinery is to be placed.

WASHINGTON NOTES.

(From Our Own Correspondent.)

WASHINGTON, D. C., Oct. 26, 1881.

A very interesting report has been received by the Department of State from the United States Consul at Cork, Ireland, upon the subject of American, Irish and English shipbuilding. The rates of wages are given in a short table, and he shows the following as the rates paid per day in Ireland:

Carpenters and shipwrights.....\$1.50
Smiths and engineers.....\$1.30 to 1.44
Joiners and riggers.....\$1.20 to 1.30
Laborers.....\$0.65 to .84
and never exceeding \$1 per day.

The days are from daylight to dark in winter, and from 6 a. m. to 6 p. m. in summer, with one and one-half hours for meals. The best paid only receive \$1.56 per day. From advance sheets of the report we take the following extract:

"Such a change can, of course, only be accomplished when its importance has been duly impressed upon the people of the United States and their legislative representatives. To those who have no personal knowledge, gained by immediate observation, of the immensity of our export trade, it will be difficult to convey this impression, but it is a significant fact that these same people and their representatives have in time past yielded cheerful and generous aid to great trans-continental railway projects, canals and other kindred internal improvements. It is, therefore, not improbable that in due course Congress and the people may become sufficiently well informed regarding the necessities and advantages of this subject to assure the requisite reformatory legislation in behalf of what may be pertinently described as external improvements. Once let it be thoroughly understood and appreciated that this needed reform will retain in the pockets of our own people the thousands upon thousands of dollars now paid to foreigners for the transportation of American products abroad, and there will be very little opposition to this movement—that is to say, prove the reform to be a good investment to the community at large, and the community will invest in it as they did in the railways and canals.

"The adoption of a policy outlined in the following suggestions might possibly aid in the advancement of this reform: 1. Let Congress as soon as possible, and as far as practicable, remove from American built ships all kinds of taxes now imposed upon them, including national, State and municipal, as well as tonnage, harbor and light-house dues and consular fees. 2. Let Congress grant such bounties or premiums, or even direct subsidies, to American ship owners as will enable them to compete with the subsidized steamship lines of other countries. 3. Abrogate as soon as possible all government contracts with foreign-built vessels for carrying the mails or any other purpose, and then pay reasonable prices for the same services to American-built ships. 4. Stimulate, also, by bounties and premiums, the shipbuilding interests of the country until it is competent to attempt, as it did years ago, a successful rivalry with the shipbuilders of the Clyde and Mersey."

The report then summarizes the whole subject as follows: "Go where you will, you will find some convincing evidence of the boundless resources of American industry and invention, or of the prolific yield of American agriculture. But also, and alas! go where you will, you will rarely, too rarely, find in any port the American flag carried by American ships bearing American goods. And this sad fact is as much a matter of amazement to the average foreigner as anything else. But it is a fact from which some of them especially interested in shipbuilding hope sooner or later to reap advantage. Knowing that they can build ships with cheap, if not pauperized labor, for less money than they can be built in America, they hope that the United States may be induced to tear down the barrier against free ships, a barrier which now serves as the sole protection to a great but languishing industry. This accomplished, they would at once supply our commerce with vessels of any and every description, good, bad and indifferent, and at the same time most effectually deplete the country by the effectual destruction of its most important resources in the event of war with any maritime power."

The report of Lieut.-Commander Sigbee upon the newly-invented sounding apparatus, the "attrahometer," has been submitted to the Secretary of the Navy and a copy furnished to the inventor. It appears that further developments and improvements will be necessary before a practical test can be made on the ocean. After these improvements shall have been made, the Government offers to extend all facilities for a practical test. A general description of this apparatus was given in this correspondence several weeks ago. The principle of the sounding indicator is the earth's attraction. The closer the earth to the ship's bottom, the greater the attraction, and vice versa. The invention, if wholly successful, will be one of the greatest achievements in this wonderful age.

The Pennsylvania Railroad Company, after a trial of four years on most, if not all, the divisions of their road, have decided to adopt the "Ashton noiseless blow-back safety valve," and have ordered 500 sets, with all fittings complete, to be shipped to Altoona.

The Cumberland Valley road is substituting the semaphore system of signals for the block system, and is receiving the articles from the Altoona shops.

Warning to English Iron Workers Not to Emigrate.

We copy the following from the Labor Tribune of October 22:

Since the inauguration of the strikes now pending at different points up to the present, the Amalgamated Association has left no stone unturned to spread the news, and, in an honorable way, gain a victory for its members engaged in such strikes. It has, therefore, been hinted in these columns that the Cincinnati and other firms in that vicinity had sent to England for men. Their objective point, we were informed, would be Leeds. With a view to thwarting the designs of these agents, we sent a cablegram, September 22, to Mr. Edward Trow, general secretary of the A. A. of I. and S. W. of Great Britain. We are pleased to say that the gentleman very kindly carried out the instructions in the cablegram, and in addition to distributing 20,000 circulars in England, Scotland and Wales pertaining to the strikes, he visited Leeds personally in our behalf, and we feel assured that he and his coadjutors in the cause of union on that side have done all they can to help us to gain a victory. In their monthly publication, the Iron Workers' Journal, of October 1, appears the following:

To the Iron and Steel Workers of England, Scotland and Wales.—FELLOW WORKMEN: We have received the following telegraphic message, and are requested to lay it at once before the workmen of the United Kingdom:

From the Members of the Amalgamated Iron and Steel Workers of the United States to the Iron and Steel Workers of England, Scotland and Wales.—BROTHER WORKMEN: We desire to inform you that the forge and millmen of Cincinnati, Covington, Newport, Aurora, Terre Haute, Zanesville and Portsmouth have been for the past 16 weeks, and still continue, on strike against a reduction in wages, and the employers at these works, finding themselves unable to conquer the workmen and enforce their demands, we believe they have now sent to Great Britain to try and induce men to leave that country for the purpose of taking the situations of the men on strike out here. We have reasons for believing that Leeds will be the first place visited by the agents from this country, and to prevent men from being deluded under false pretences, we send this information for circulation, and request all British workmen not to be induced by the plausible tales of the employers' agents to come to this country and aid their and our common enemy—the capitalist—to defeat their fellow-workmen, who are fighting for right and justice. Yours fraternally, J. JANRETT, President. W. MARTIN, Secretary.

We gladly circulate the above information, and as the interest of labor is universal all the world over, and it needs the combined efforts of workmen of all countries in resisting the attempts of capital to reduce the value of labor so that, while the wealth of the capitalist increases, the sons of toil can scarcely get bread to eat, and suffer privation and misery, and we trust the appeal of our American brother workmen will be successful, and that no workmen from this country will allow themselves to be induced by agents to cross the Atlantic for the purpose of blacklegging brave men who are fighting for right and justice, and assist the American employers to defeat American workmen. W. SHAW, President. E. TROW, General Secretary.

Bursting of a Big Fly Wheel.—A stationary steam engine of 100-horse power in the silk mill of E. B. Atterbury & Co., at Straight and Ellison streets, Paterson, N. J., "ran away" on the morning of the 10th inst., and the belt slipping off the 8-ton fly-wheel soon afterward, the wheel attained a tremendous speed and broke in pieces, which were hurled with immense force through the roof and side wall of the engine room to distances of several hundred feet. Some of the fragments, hurled half a block or more, weighed 500 pounds. The engine had not been used for 10 or 12 years, but had recently been overhauled with a view to being set to work on Nov. 1. When overhauling the engine it was found that the cut-off valve was broken and a new one was put in. On the morning of the 10th the fireman let in steam to a small engine which was connected with the large one, and the latter at once started up. He tried to shut off the steam, but found the valve would not work, and he and another workman both tried to turn the valve. While they were still holding on the belt slipped off and the wheel burst. Neither of the men were hurt, nor was any other person, although a huge fragment of the wheel fell at the feet of the engineer, nearly a block away, as he was walking to the mill. Subsequent examination showed that the new shut-off valve was broken worse than the one it replaced. The damage done is estimated at \$2000.

Prizes to Americans at the Electrical Exhibition.—As a mark of the highest distinction, diplomas of honor have been awarded to the United States Signal Office, the Smithsonian Institution, the United States Patent Office and Messrs. Edison, Graham and Bell. Gold medals are awarded to the Anglo-American and Brush Electric Light Companies, the United States Electric Lighting Company, Eliza Gray and Taintor, Silver medals to Bailey & Puskas, Connolly Brothers & MacTigue, Dolbear, Eccard, Electric Purifier Company, Hubbard Pond Indicator Company, Western Electric Manufacturing Company, Western Electric Light Company and the Electro-Dynamic Company. Bronze medals to Messrs. Chavet, Cumming and Dion, the Hoosac Tunnel Company, the Trinitro-Glycerine Works, Partz, Photo-Relievo Company, Whitehouse, Mills & Williams. If the relatively small number of American exhibitors be considered, it will be seen that they have carried off a very large number of prizes. The awards have been made for the ensemble of each exhibitor's contribution, not for any single invention exhibited, except, of course, where there was only one. No exhibitor of electric light except Edison has carried off a diploma of honor.

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AND
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The telegraphic correspondence between the Amalgamated Association of Iron and Steel Workers of the United States and the Amalgamated Association of Great Britain, elsewhere printed, is interesting. Only one point, however, needs editorial consideration. The words, "their and our common enemy—the capitalist"—if not new, are none the less startling. If workmen who look upon the men who employ labor as their enemies could only read with understanding the old fable of the war between the several members of the human body, they might learn therefrom something worth remembering. Nothing more misleading and mischievous was ever uttered than this talk about the enmity of capital and labor. It is like enmity between the hammer and the hand that wields it; between the mechanism and the power which drives it; between the mind and the body. It requires not even average intelligence to see that

production depends upon harmonious co-operation between labor and capital. There may be at times, and perhaps often, a proper conflict of interest between them, for as society is now organized there seems to be no other way of establishing harmony than by such conflicts. Strikes may sometimes be necessary and desirable as promoting a readjustment of the relations of employers and workmen, and effecting a reapportionment of the proceeds of their co-operation. They could be avoided if both masters and men would agree upon some system of arbitration and conform to its decisions, but for the present this seems to be impracticable. But the workman who looks upon the capitalist as his enemy, or the capitalist who considers that his workmen are his natural enemies, might be called a fool without any violation of the proprieties. The sooner such phrases as "our common enemy, the capitalist," are eliminated from the literature of the trades unions, the better it will be for all classes of the community.

The Cotton Tie Case at Philadelphia.

The cotton tie case that was on trial at Philadelphia last week, in the United States Circuit Court, before judges McKennan and Butler, was of the greatest importance, not only to the hoop iron manufacturers of the country as being directly involved, but also to all iron manufacturers, as any act that reduces the demand for hoop iron makes the mills equipped for that manufacture competitors in the general iron market. The case was brought by Kennedy Bros., of Louisville, on account of an importation of 9000 bundles of so-called cotton ties. The Collector at Philadelphia assessed duties on these as hoop iron, at 1½ cents per pound. Kennedy Bros. claimed they were dutiable as manufactures of iron not otherwise provided for, and therefore dutiable at 35 per cent. ad valorem. The alleged excess of duty demanded was \$3972, and suit was brought to recover this amount. These bundles consisted of 30 pieces 15-16 or 1 inch No. 18 hoop iron, covered with paint and with 30 buckles strung on one hoop, all being bound together with bands. The bundles weighed 50 to 56 pounds. The plaintiff contended that these articles had ceased to be hoop iron; that they were not known in the trade as hoop iron, but as cotton ties; that they were bought and sold as such; that under an order for hoop iron, bundles similar to those in question would not be sent; that the iron as it came from the rolls, uncut and unpainted, put up in bundles of 56 pounds, would be sent, and that such hoop iron was what was known commercially as hoop iron. He claimed further that though the so-called cotton ties were made from hoop iron, they could not be economically used for the purposes for which hoop iron is commonly used; also, that the article was a completed manufacture, separate and distinct from hoop iron as known to the law.

The defendant contended that the article in question was nothing but hoop iron; that, though called cotton ties, they were not taken out of the category of hoop iron, but were so called to distinguish a use, the same as barrel hoop, trunk-hinge iron, lock-plate iron, &c., were different varieties of hoop iron, so-called to indicate use; that cutting them to 11-foot lengths did not take them out of the category of hoop iron; that painting them did not, and that stringing thirty buckles on one piece did not, nor did all of these together. Even as cotton ties they were not complete until each piece of hoop iron had been bent at the ends and the buckles attached to each one; that at best the bundles, as imported, were not cotton ties finished and complete, but materials for cotton ties. It was acknowledged that an order for hoop iron would not be filled by sending cotton ties, not because the so-called cotton ties were not hoop iron, but because they were not the kind of hoop iron wanted.

We have not the space to review the evidence at length. It was largely technical, and involved some nice distinctions that the jury, who were very intelligent, did not seem to grasp, nor did the judges. The charge, which was delivered by Judge McKennan, made the case turn wholly on the question as to whether the article had been taken out of the category of hoop iron and made a manufacture of iron, and it was very strongly charged that it had been. The Judge stated that it was not necessary to attach to each piece of iron its appropriate buckle to make it complete, as stringing them all on one iron was, in fact, the same thing. Under this charge the jury found, as they must, for the plaintiff. The course of the trial had been such as to indicate that the case was going for the government, and the charge of the judge, in view of the testimony, was a complete surprise to the defense at least, if not to the plaintiff. It certainly does seem that an article is not complete until it is complete; that so long as anything remains to be done to the article to fit it for its use, no matter how small the work may be, even if it is only bending an end of a hoop to fit it for a buckle, it is not complete, and Judge McKennan would seem to be wrong in charging that the cotton tie was complete when the 30 buckles were all attached to one band. We are not advised as to the course the government will pursue in the case, but presume it will be taken to the Supreme Court. The District Attorney, who handled the case very ably, took exceptions to a large part of the testimony, and it will

go up on exceptions. In the meantime it is incumbent upon manufacturers to see that the law is so amended as to leave no doubt as to its intent.

The Freight Blockade in the West.

What may be termed the Central West, or that part bounded by the Alleghenies, the Lakes, the Ohio and the Mississippi, is now, and has been for some time past, experiencing the most serious freight blockade in its history. It seems almost impossible to get freight through. A carload of steel will be five to eight weeks going from Pittsburgh to Louisville, and from Pittsburgh to St. Louis the time is indefinite. For ten days no freight has been received at Pittsburgh for St. Louis, and recently for five days freight was refused for Louisville. Five thousand cars of freight are said to be collected at East St. Louis, waiting transfer into the city. A similar state of affairs exists at Chicago, Cincinnati and Louisville. This large accumulation of freight of course holds the cars, and makes a car famine at points where there is no blockade. This is having a serious effect on the blast furnaces of the section named. It is impossible to get cars to move coke, and furnaces are banking up or blowing out to await supplies of coke. It is also disarranging trade. Goods ordered will be shipped through by the ordinary route of shipment and will be "side-tracked" somewhere, for how long no one knows. Stocks at the point of destination will be exhausted, and in desperation the order will be duplicated by some other route, with the result, when both shipments come in, of a surplus stock. The enormous amount of property thus held in transit also disarranges the money market, locking up immense sums of money, and making a more than usually heavy demand for currency.

There are several causes which have produced this state of affairs. Primarily the cause is, of course, the immense volume of business that is being done all over the country. The low rates ruling have created a desire to get goods forward while they are continued. The stage of water in the Ohio has been such that the hundreds of thousands of tons of freight that are usually shipped at this season of the year for the West and Northwest, have had to seek rail routes. It is also true that the railroads have not prepared for this business. They have believed that when they had arranged to move the freight and had provided the rolling stock, there would be no difficulty in handling the business, and this heavy traffic has found them with little or no increase in terminal facilities. The platforms, stations and appliances are the same as before; the force at these terminal points has not been increased to take care of the freight as it comes in, and the blockade is the result. This makes more manifest the need that has been pressing itself upon the attention and occupying the thought of railroad men for many years—better terminal facilities. With plenty of space the necessary platforms for receiving and discharging freight can be built and business taken care of, but in the large cities space is valuable. We do not know that any method could be devised for the more rapid and economical handling of freight which would demand less space than now appears to be needed, but this is one of the great problems of railroad management, and the demands of the future will necessitate some change. What room is needed must be had. Time is worth more than land, however costly the latter may be.

A New Trunk Line of Railroad.

A hundred years ago Washington tried to impress upon his countrymen the great need of a canal that should unite the waters of the James and the Ohio. He had scarcely closed his duties as commander-in-chief of our armies before he called the attention of his native State to the importance of this water-way. His several journeys west of the Alleghenies had convinced him that the route was practicable, and his great mind foresaw the future empire that was to have its seat in the Ohio Valley. It was his purpose that the commerce of this empire which must seek the seaboard should flow through and pay tribute to his native State. This was the origin of the James River and Kanawha Canal Company which, under the name of the James River Company, was organized in 1785, and has for nearly a century been stretching out to the passes of the Alleghenies, but has never reached them. While this dream of Washington has been unfulfilled, this great empire of the Ohio Valley, or more properly, the Mississippi Valley, has grown to a power and influence of which Washington never dreamed, and this great stretch of plain and valley has become the granary of the modern world. But the vast traffic that has come with it did not seek the route that Washington marked out, but came east to the seaboard either through the pass where the Alleghenies break in New York, or was lifted over them at Altoona and Cumberland. Pennsylvania and New York have grown rich, while Virginia has made but little material advance.

This month has witnessed the completion of the old and the beginning of a new chapter in the history of this project. The canal has been finally abandoned, and its place has been taken by a railroad, which, on the 15th of October, was opened the entire length of the James River. H. C. Parsons, the vice-president of what is now the Rich-

mond and Allegheny Railroad, became convinced that the canal scheme that had cost so much must be abandoned, and that it was by rail that the waters of the two valleys should be united. He impressed his views on several gentlemen, prominent among whom was Mr. F. O. French, of New York, who became the president of the railroad that has been completed. The more difficult task of convincing the State and other owners of the old canal was undertaken. It was successful, and the bill authorizing the sale of the James River and Kanawha Company's works to the Richmond and Allegheny Railroad became a law in 1878, and on the 5th of March, 1880, the final contract between the two companies was executed. Track laying was commenced on the 8th of July, 1880, at Maiden's Adventure, and on Friday afternoon, the 14th of October, 1881, the last rail was laid on the Lexington division, the main line having been completed nearly a month before. This is rapid work, but the road is well built with steel rails, iron bridges, stone viaducts, and the lowest grade of any road of equal length on this continent. It passes through a country that has been developed by the canal, and occupies an immensely rich mineral district. Upon the 250 miles of railroad there is a first mortgage of \$20,000 per mile, and for equipment a few of the second mortgage bonds have been placed. It has entrance into the heart of Richmond, and the property the company has in that city could hardly be duplicated for one-half the mortgage debt. The property and franchises of this road are immensely valuable, and as a local road its future was assured. But its projectors would have fulfilled neither the hope of Virginia nor the scheme that their own good judgment told them was necessary, had they stopped in the heart of the Alleghenies at the head of the James. They projected a line not only to the Ohio, but to the great lakes, and arrangements have been made for a consolidation with the Ohio Central, which runs from Toledo through the Hocking Valley to the Ohio. This will involve the building of a road from the end of the James to the Ohio. The project of uniting these two roads requires the construction of 270 miles of new road, including a bridge across the Ohio. Contracts have already been let and the money has been provided with which to build about 140 miles of this road, leaving about 135 miles to be provided for.

The surveys are complete and final locations are made for all except about 30 miles of the lighter work. The route leaves the Richmond and Allegheny at Eagle Rock, 215 miles from Richmond, and follows the valleys of Craig's and Sinking creeks to New River, 62 miles; thence through the valley of New River past Hinton to Gauley, 86 miles; thence through the valley of Great Kanawha to Point Pleasant, 106 miles—making a distance from Richmond to the Ohio River of 469 miles. The distance from the Ohio Central to the Ohio River is 48 miles. The line will have a summit level 50 feet lower than the Chesapeake and Ohio, and lower than any line south of the Erie, and from the Ohio River to Richmond the minimum grade east or west will be 30 feet. The line crosses the Pittsburgh coal seam at Raymond City; passes through Charleston and Malden and all the salt furnaces of Kanawha. It passes the great operated coal mines at Campbell's Creek, Cannellton, and Hawk's Nest, and west of Hawk's Nest there is business enough already developed to sustain the road.

This road is of more than usual importance. It gives another great trunk line East and West, and will compete with the New York Central, Erie, Pennsylvania and Baltimore and Ohio lines for the trade of the West. It will pass through some of the finest coal and iron regions on the continent, and by its Virginia connections and a road that will undoubtedly be built to Pittsburgh, will reach a belt of minerals such as is reached by no other railroad. Its future promises to be very successful; and the section it traverses, with its bounteous fertility of soil, its incalculable resources of mineral and its unexcelled water power, is a sure warrant that a great industrial power will be built up along its line, and new centers of manufacturing and commercial activity be established in districts now lying outside the busy circle of our national activities.

Describing the commercial situation with reference to the restricted business transacted in produce in the New York market as a result of speculation, and the less confident and hesitating disposition manifested in some quarters, the case is concisely stated by *Bradstreet's* in the following words:

This unmistakable and significant reaction from the remarkable buoyancy of the late summer and early autumn months has been traceable, in great measure, to the influence of the enormous and accumulating supplies of breadstuffs and provisions at the West and on the seaboard; to the very slow and unsatisfactory forwarding movement from the interior at a time when extraordinary advantages are available in the way of abundant and very cheap transportation facilities; and to the discouraging decline and demoralization in the export trade, as resulting from the recent formidable speculative disturbances in produce values, placing our markets almost continuously much above the parity of prices in Western Europe.

Aside from the evils inflicted upon the public at large in the shape of exorbitant prices for all sorts of breadstuffs and the general disturbance of trade, the severest blow falls upon all in any way concerned in lake and canal transportation, whose business for the season has been well nigh destroyed. The railroad corporations, on the other hand, ask no sympathy, for they have had

their tracks free all summer for general transportation and are guaranteed an exclusive traffic in grain through the coming winter—perhaps on an enormous scale and at their own rates.

Three Great Steamships.

The three great steamers, *City of Rome*, *Servia* and *Alaska*, belonging to the Inman, Cunard and Guion Lines respectively, will all arrive in New York within a few days—indeed the first-named has already arrived. The length of these steamers, in the order named, is 546, 530 and 520 feet, taking rank in point of size only second to the *Great Eastern*, and in speed they will probably attain 17½ knots, against only 14 knots for their famous predecessor. All three are built of steel. The *City of Rome* has two complete iron decks above, while the lower deck is complete for half the length, and has wide plating on each side for the remainder. The deck houses and turtle decks on the upper deck are of iron. The three engines are set "tandem," and drive a single screw propeller 24 feet in diameter. The crank and screw shafts are of fluid compressed steel, the former being 25 inches in diameter, and weighing 63 tons, or 11 tons less than if of iron. A feature mentioned in the steam department of this vessel is that its engines can be reversed from full speed ahead to full speed astern in five seconds by an improved mechanical device. As a fact, this same device was adapted to the American Line vessels built by William Cramp & Sons, of Philadelphia, nine years ago; so that the invention may be claimed as purely American, and has been extensively used on American-built vessels since that time.

The *City of Rome* arrived in this port on Monday, the 24th inst., having sailed from Liverpool on the 13th—a passage which cannot be called short, even for a first one. Her friends are somewhat chagrined to find that the *Arizona*, leaving Liverpool on the 16th inst., arrived before her. The Inman people claim that the new steamer is the largest afloat, choosing to ignore the *Great Eastern* entirely. The test of speed is hardly conclusive, the new engines being "stiff," and from the particulars at hand it does not seem improbable that the vessel was driven too hard, the results of which were seen in the several stoppages necessary in order to cool bearings and keep the engine at work. The tonnage of the *City of Rome* is 13,000 tons, that of the *Great Eastern* 22,000, and the latter vessel is at least 100 feet longer.

The *Servia* will have a cargo capacity equal to 6500 tons, with 1800 tons of coal and 1000 tons of water ballast, the vessel having a double bottom on the longitudinal bracket system. Her engines are on the compound principle, with one high pressure and two low pressure cylinders. There are seven boilers, made of steel, with 39 corrugated furnaces. The hull is divided into nine water-tight compartments. A special feature of the vessel is the arrangement of the water-tight doors in the engine and boiler spaces. These can be shot from the upper deck in case of accident, and they possess this advantage, that they can be closed in about two seconds, while the usual style requires the door to be screwed down, which takes considerable time. The deck is of steel, covered with yellow pine; the main deck is of steel covered with teak, and the lower decks of steel with a tank covering above the engine and boiler spaces. All the deck houses and fittings, which are liable to be carried away in a heavy sea if made of weaker material, are made of steel and iron, and are riveted to the steel decks underneath. Nearly all of the other lines have new ships building, the *Red Star* having ordered four, and others are known to be only awaiting the results of actual trial in the instances mentioned above before giving out additional contracts. The experience already had with the *Arizona* and *Elbe* shows what rapid strides have been made in ocean navigation within the last few years.

Trade Accounts.

The latest accounts respecting domestic trade are all favorable, at least in the chief wholesale markets. The effects of drought are more or less the subject of complaint, but ample compensation for shortened crops is found in the high prices realized. St. Paul papers speak of the remarkable extent and activity in merchandise sales, and the same feature is remarked elsewhere in the Northwest, the stimulus being due to a good harvest and full prices. The *Minneapolis Tribune* of last Friday says: "The people of Minnesota and Dakota, and of fractional portions of other Northwestern States, are exceptionally fortunate in that they have harvested good crops, and are now receiving for their surplus a scale of prices so surprisingly high as to surpass the dreams of the most sanguine and satisfy the greed of the most grasping. Last year, following harvest, No. 1 wheat sold at our railway stations at 68 to 75 cents. This season the same grade started off at 90 cents and rapidly rose to \$1.35, at and near which figure a large volume of grain has been marketed." In Boston, according to the *Prices Current* of Saturday, sales in most branches of business are considerably in excess of last year's at the corresponding date, and in some classes of goods, such as stoves, crockery and furniture, orders are more than can be conveniently filled. In Philadelphia, the distribution of general merchandise since

the beginning of the fall season has been above the average, and in the values of manufactured articles there is an improvement in some cases. The demand for all descriptions of manufactured iron exceeds that of any previous season. In Baltimore the volume of business done by jobbers is spoken of as very satisfactory. In Canada there are expectations of an active trade during the next four months, as the agricultural classes have been able to obtain better prices for their products than usual. On all sides the outlook is cheering.

Course of the Tin Plate Market.

Tin plates have fluctuated a great deal less this year than they usually do, the change in price from one month to another seldom exceeding 25 cents per box. The average price of ordinary brands at the beginning of the year was \$5.67, and on Oct. 12, \$5.40.

The following tables will show the range of prices of tin plates in former years:

AVERAGE PRICE OF TIN PLATES (ORDINARY BRANDS) AT NEW YORK ON THE 1ST OF EACH MONTH, 1879 AND 1880.			
1879.			
January.....	\$5.33	July.....	\$5.50
February.....	5.70	August.....	5.40
March.....	5.75	September.....	5.57
April.....	5.67	October.....	6.66
May.....	5.66	November.....	7.28
June.....	5.43	December.....	7.11
1880.			
January.....	\$6.11	July.....	\$5.49
February.....	8.72	August.....	5.70
March.....	6.58	September.....	5.78
April.....	8.00	October.....	5.46
May.....	6.75	November.....	5.40
June.....	5.88½	December.....	5.39
PREVIOUS PRICES.			
July 1, 1874.....	\$8.71	February 28, 1878.....	\$5.66
April 28, 1876.....	6.58	March 31, 1878.....	5.65
May 5, 1877.....	5.97	April 30, 1878.....	5.72
September 7, 1877.....	6.00	May 31, 1878.....	5.37
October 10, 1877.....	5.97	June 15, 1878.....	5.35
December 20, 1877.....	5.85	July 15, 1878.....	5.33
December 31, 1877.....	5.77	October 3, 1878.....	5.18
January 1, 1878.....	5.74	December 18, 1878.....	5.24

The highest point, it will be seen, was reached at New York last year, in March, under the impulse of speculation. Since then it has gradually settled down to about the ruling on Oct. 12, 1881.

In England coke tin has of late been recovering from the price of 16/. The average price at Liverpool was, for coke tin, 22/8 per box in 1875, 19/6 in 1876, 17/8 in 1877, 15/1 in 1878, 19/5 in 1879 and 18/8 in 1880, the average of the ten years ended Dec. 31, 1880, being 23/. The British export movement is shown in the following table:

TOTAL EXPORT OF TIN PLATES FROM GREAT BRITAIN.			
Year.	Tons.	Year.	Tons.
1871.....	116,666	1876.....	138,354
1872.....	116,081	1877.....	153,248
1873.....	120,658	1878.....	155,240
1874.....	122,950	1879.....	197,849
1875.....	138,103	1880.....	217,605

From the above it will be seen that the exportation has nearly doubled in the short space of nine years. Production this year has varied very little from that of 1880. The stocks at Liverpool, which were 360,000 boxes on Jan. 1, 1881, were reduced to 260,000 on Oct. 1, while in the rest of England the stock was estimated at 150,000 boxes. Shipments to the United States during the first nine months of 1881 were 2,230,000 boxes, against 2,235,000 during the corresponding period of last year. At the same time, the increase of shipments to other countries was, as compared with 1880, some 30,000 boxes. Last year these shipments to other countries were small, because in 1879 they had been excessive. The stock at New York is an average one, being 180,000 to 200,000 boxes. Consumption in this country has been good, except for fruit canning grades, which has fallen off materially in consequence of the poor fruit and vegetable crops by reason of the prolonged drought.

From what precedes it will be seen that the position of tin plates is favorable, for they are comparatively cheap, the more so since tin has been rising so rapidly. This fact has not failed to attract attention; hence the improvement in value lately going on in Liverpool and responded to here. When ruling at about present prices tin plates are consumed very extensively, superseding other material for many uses; it is, therefore, to be hoped that speculation may not run them up again, as was the case two years ago, involving loss to the dealer and consumer in the end.

One of the leading metal statisticians here figures up, from tables specially prepared, that during the past seven years the import of coke tin plates into the United States has been 50 per cent. of the entire amount, that of tines 24 per cent., and that of charcoal bright 26 per cent. Cokes are chiefly consumed for cans, tines for roofing and charcoal bright for tinware. Our present import averages about 3,000,000 boxes of all sorts annually, of which cokes at the above rate would, therefore, represent one-half, or 1,500,000 boxes. Of these, 500,000 are used for oil, 750,000 for fruit preserving, and 250,000 for various other purposes of canning, &c. Now, this gentleman estimates the falling off for fruit canning consequent upon the drought at 20 per cent., which would constitute a lessened consumption of cokes of 150,000 boxes. We have consulted another firm in this line, and hear that, so far as their trade indicates, the demand for coke thus far shows no such falling off. It is, therefore, a debatable question, which the near future will solve.

The consumption of rails in Germany in 1878 was 1,218,660 tons. The correspond-

ing consumption in 1879 was 586,110 tons, and in 1880, 852,700 tons, making a total for the three years of 2,657,530 tons. Nearly the whole of the rails thus consumed were steel.

For many years strikes were almost unknown in France. This was partly due to the workings of the admirable system of conciliation and arbitration in operation in that country in its *Conseils des Prud'hommes*, and partly to the laws against organization and conspiracy of workmen. Latterly, however, strikes have been more frequent, especially in those localities in which these *Conseils* do not exist. Some of these have had features that have been nearly, if not quite, unknown in the history of strikes in other countries. A few months ago a strike of factory operatives occurred at Roubaix. The Town Council was composed of a majority of workmen. The subject of the strike was brought before it, the men were declared by vote to be in the right, and the Council actually voted 50,000 francs to support the strikers. The subsidy was not paid, however, the Prefect, who has an absolute veto, exercising his power to prevent it. A similar case happened in the Department Allier, the Town Council taking the same action, in this instance, however, voting only 25,000 francs.

Confusion arises from the similarity of names adopted by the Industrial League, headquarters in Philadelphia, and the Industrial League of America, an organization lately created in Chicago. The latter has been peculiarly unfortunate in seeking a distinctive title, and Mr. Cyrus Elder, secretary of the original institution, only discharges an obvious duty in suggesting that Mr. John A. Norton, secretary of the Chicago association, drop that part of the title that had been already appropriated by another organization.

General Dumont, the Supervising Inspector of Steam Vessels, is about to recommend in his annual report a reduction in the tax on steamboat officers, which is represented to be very oppressive and unnecessary. The tax varies with the rank of the officer, but averages about \$7.50 per capita every year. The amount already accumulated from this source reaches \$649,320—far beyond the necessities of the public service. The suggestions of General Dumont should be favorably acted upon by Congress at the approaching session.

The *Railway Review* calls our attention to the fact that in our issue of Oct. 13 we credited the article on "Excessive Railway Building," page 9, to the *Railway Age* instead of to the *Railway Review*, from which it was taken. The article was a valuable one and we are glad to give the credit to the proper source.

Enforcing the Conspiracy Law in Pennsylvania.—A dispatch from Greenburg, Pa., under date of October 23, says: Some months ago D. K. Jones, General Secretary for the Mines of Western Pennsylvania, and Hugh Anderson, pit boss at a coal mine at Coulterville, Allegheny County, were convicted of conspiracy in speaking to a meeting of strikers at the mine to induce them to remain out. Yesterday both men were called up for sentence before Judge Hunter. Many coal operators were present in the court-room, and great interest was felt in the case. Judge Hunter said to Mr. Jones that the sentences would be light, as the cases were brought more to test the law than for punishment. The law makes the imprisonment and fine imperative, and he would therefore be compelled to impose a sentence, and he hoped that after this Mr. Jones would be careful and not interfere with the men while at work, but let the men look out for themselves. He therefore imposed the following sentence: That D. R. Jones be imprisoned in the county jail for 24 hours, pay a fine of \$100 and the costs of prosecution, and remain in custody until this sentence is complied with. Hugh Anderson had a similar sentence imposed upon him. Mr. Jones gave his check on the Anchor Savings Bank, of Pittsburgh, for \$100, to cover the costs and fines in both cases. Both the prisoners were very anxious to escape imprisonment in the jail, but Ex-Senator Cowan, their counsel said there was absolutely no escape, and both were placed behind the bars. The case will be brought before the Supreme Court to-morrow. The paper book is already printed and everything is ready for the argument this week. Ex-Senator Cowan will make the argument in behalf of Jones. Jones and Anderson were both released this afternoon, and left for Pittsburgh.

The following is the programme of the meeting of the Mechanical Engineers, to be held in this city on the 3d prox.:

THURSDAY, NOVEMBER 3.	
Afternoon session, Turf Club Theater.....	3 p. m.
Evening session, Turf Club Theater.....	8 p. m.
FRIDAY, NOVEMBER 4.	
Morning session, Turf Club Theater.....	10 a. m.
Afternoon session, Turf Club Theater.....	2 p. m.
Subscription dinner, Delmonico's, 212 Fifth Avenue.....	7 p. m.

The iron ore shipments from Lake Superior continue to be in excess of the product of last year. Should the same ratio of increase be maintained till the close of navigation, the total lake shipments will aggregate very nearly, if not quite, 2,250,000 tons. The lake shipments during the last six weeks of 1880 amounted to 306,427 tons, and the ratio of increase, if maintained, ought certainly to add at least 450,000 tons to the lake output already reported for the present season, to which there will remain to be added at least 100,000 tons shipped by rail to local furnaces.

AMERICAN INSTITUTE OF MINING ENGINEERS.

HARRISBURG, PA., October 25, 1881.

The fall meeting of the American Institute of Mining Engineers met to-night to begin what promises to be a very pleasant and profitable session. The attendance is large and representative, and although the heat of the past summer seems to have had the effect of discouraging the preparation of papers, the meetings will not lack scientific interest, while the opportunity afforded of visiting the metallurgical establishments and mines in the vicinity of Harrisburg, will be agreeable and instructive to all who are here.

The opening session was held in the hall of the Young Men's Christian Association, president Wm. Metcalf, of Pittsburgh, in the chair. Mr. Jones Wistar, on behalf of the local committee, introduced the Mayor of Harrisburg, who made a brief address of welcome. He was followed by Lieut. Gov. Stone, who, in the absence of Gov. Hoyt, also welcomed the Institute with well-chosen and eloquent words, dwelling upon the extent and value of the mineral resources of Pennsylvania, and the importance of the work of the mining engineer and the metallurgist in building up our great industries. Mr. Metcalf responded briefly, but effectively, to the addresses of welcome, and then opened the meeting with a few words addressed especially to the younger members. He said, in effect, that one of the most encouraging evidences of the success of the Institute, and most promising indications of its future, was the presence at recent meetings of the younger men in the membership. This was encouraging, as it gave promise of the continued usefulness of the Institute. The work before the young men of the profession represented by the Institute was varied and interesting, and there were evidences that it was appreciated. He suggested several topics calling for investigation, among others the dangers connected with electric lighting—not only the fire risk attending the carrying of wires into buildings, but the danger to life as well. Mr. Metcalf concluded by calling attention to the presence in the meeting of Mr. E. P. Martin, of Blenvenon, Wales, and Mr. E. Windsor Richards, general manager of Bolckow, Vaughan & Co.'s works, who would speak by invitation on the history and practical development of the basic process. He congratulated the membership on having this opportunity of hearing from these gentlemen. The younger men of the Institute would probably see, and perhaps aid materially in promoting, a metallurgical progress which would rob such impurities as phosphorus, sulphur and silicon in ores of all importance, and give all ores, of whatever chemical composition, a value in proportion to the iron units they contain.

The next business of the meeting was the election of members, and upward of sixty gentlemen, more or less prominently connected with mining, chemistry, metallurgy and engineering, whose names had been passed upon by the council, were elected. The first paper of the session was read by Mr. S. H. Chauvenet, of the Pennsylvania Steel Company, which is of so much interest that we give it in full:

THE INDUSTRIES OF HARRISBURG.
Harrisburg is situated on the Pennsylvania Railroad, 105 miles from Philadelphia, 235 miles from Pittsburgh, and 90 miles from Baltimore, and has running through it the Pennsylvania, Northern Central, Philadelphia and Reading and Cumberland Valley Railroads, and the Pennsylvania Canal. Surrounded by a thickly settled farming country from which to draw native labor, within easy distance of anthracite and bituminous coal, with ores and limestone near at hand, and with the Susquehanna River as a never-failing water supply, Harrisburg has advantages for manufacturing which warrant the investment of the capital that has already been made, and has a future as a manufacturing city second only to Pittsburgh and Philadelphia.

THE PENNSYLVANIA STEEL COMPANY.—L. S. Bent, superintendent. The works of this company, the largest in Harrisburg, lie between the Pennsylvania and the Philadelphia and Reading Railroads, on the Pennsylvania Canal, and are essentially devoted to the manufacture of Bessemer steel rails. Capital stock, \$2,000,000; invested in business, \$5,000,000; wages per month, \$80,000; employs 2000 men; capacity, 100,000 tons of rails per year, which is being increased to 130,000 tons. The plant, as it now stands, comprises 5 Bessemer converters, 2 7-ton and 3 8-ton converters, 2 15-ton open-hearth furnaces in operation and 2 30-ton open-hearth furnaces in course of construction, 1 blooming mill, 1 rail mill, 7 steam hammers, 2 blast furnaces in operation, 2 blast furnaces in course of construction, foundry, pattern shop, machine shop, blacksmith shop, and frog shop, and merchant mill in course of construction.

Bessemer No. 1 was built in 1865, with 2 7-ton converters, 2 spiegel cupolas 3 feet diameter, and 3 iron cupolas 6 ft. 6 in. diameter, and has a capacity of 500 tons in 24 hours. The blowing engine is a horizontal condensing engine, with 2 steam cylinders, 40 x 60 in., and 2 blowing cylinders, 54 x 60 in. Pressure of blast, from 20 to 25 pounds.

Bessemer No. 2 was built in 1881. It has 3 8-ton converters, served by 2 hydraulic ladle cranes in 2 casting pits, and 6 hydraulic cranes for setting and drawing molds, handling bottoms, &c. The hydraulic pressure is 300 pounds per square inch. The blowing engine is a compound horizontal with a high pressure cylinder, 25 x 70 in., and low pressure, 50 x 70 in., with separate air-pump condensers, and also a Bulkley condenser attached. Pressure of blast, 25 to 30 pounds. This engine was built in the Pennsylvania Steel Company's shops. There are 4 iron cupolas, 6 ft. 6 in. diameter, and 4 spiegel cupolas, 3 ft. diameter, blown by 2 No. 7 Baker blowers, or two 3-cylinder blowing engines. The capacity of this Bessemer has not yet been determined, as it has only been in operation two weeks. There are many points of improvement over the old Bessemer which cannot be described in this paper for want of time. All the castings,

boilers, roofs, wrought iron work and engines of this plant were made and erected by the Pennsylvania Steel Company.

The blooming train is three high; rolls 34 in. in diameter, driven by a vertical condensing engine, 44 x 54-in. cylinder. The capacity of this mill has never been determined, but is easily 600 tons in 24 hours. The ingots are delivered hot to the blooming mill from the Bessemer, and charged into 4 Siemens heating furnaces, 6 ingots being a charge for each furnace. The ingots are 14 inches square and make 4 rails each. The blooms are cut under a 4-ton steam hammer (Sellers), and are loaded by a hydraulic crane on buggies, which are pulled by a water engine to the rail mill.

The rail train is three-high; rolls 23 in. diameter, driven by a 40 x 60 in. engine, with Bulkley condenser attached. This train has rolled 1916 rails in 24 hours. The saw train is Gustin's patent. Two straightening presses and 2 drill presses handle the rails as fast as rolled. The open-hearth furnaces, built in 1875, consisted of 2 6-ton furnaces, which were enlarged later to 15-ton capacity. The new open-hearth furnaces in course of construction are each 30-ton. Each furnace has a casting pit, and the two are served by five hydraulic cranes. A 14-ton steam hammer is placed between the blooming mill and rail mill. Under it heavy shafts, cross-heads and piston rods are forged. When not in use for heavy work it hammers special steel into slabs and billets. A 4-ton hammer, adjoining the blooming mill, and a 1-ton hammer in the rail mill are used almost exclusively for slabs and billets.

The foundry, 60 x 225 ft., has two cupolas, 5 ft. diameter, 2 core ovens and 5 15-ton steam cranes. All ingot molds are made here, and all castings for repairs and new work. The capacity of the foundry is 40 tons of finished castings a day. The pattern shop has 2 circular saws, 1 Daniel's planer, 1 hand planer, a bandsaw and 1 lathe, and bench room for 14 men. The machine shop is 75 x 230 ft., and contains 13 lathes, from 96 x 10 in.; 5 planers, which take from 8 ft. square to 20 in. square; 1 48 in. boring lathe, 1 84 in. boring and turning machine, 3 10-ft. radial drills, 2 drilling machines, 2 shapers, 2 slotting machines, 2 horizontal boring machines, 2 bolt cutters, 1 pipe cutter. The blacksmith shop, 60 x 75 ft., contains 2 1000-pound steam hammers and 14 fires. The boiler shop, 75 x 125 ft., contains 3 drill presses, 2 shears, 1 punching machine, bending rolls and 1 hydraulic riveting machine. In this shop all steam boilers, draft stacks and iron roofs are built. The frog shop, 60 x 400 ft., has a capacity of \$30,000 to \$40,000 per month in railroad frogs and switches, crossings and interlocking apparatus. It contains 14 planers, 6 drill presses, 2 slotters, 2 lathes, 1 milling machine, 1 shaper, 1 pin machine, 1 steam hammer, 1 combined punch and shear, 1 single punch, 1 steam riveter, 1 hydraulic bending machine, 10 fires and 1 heating furnace. A new frog shop is to be put up immediately, 80 x 400 ft., with improved facilities.

Blast furnaces—No. 1, 14 x 60 ft., is blown by a vertical condensing engine, 84 in. blowing cylinder, 48-in. stroke. It has 4 pipe ovens of Kent's pattern; the fuel used is anthracite coal and coke; the ores are native Pennsylvania, Virginia and New Jersey, and Spanish and African. The product is 50 to 60 tons per day. No. 2, 20 x 76 ft., is blown by two vertical condensing engines, 84 x 48 in.; 3 Whitwell stoves, 18 x 60 ft.; fuel and ores are the same as No. 1; product, 240 tons per week. The product of both furnaces is used in the Bessemer. No. 3 and No. 4 blast furnaces are each 16 x 65 ft. They are to be blown by vertical condensing engines, 70 x 48 in., 2 blowing cylinders to each engine, with capacity for 22,000 cubic ft. of air per minute. These engines are being built by the Pennsylvania Steel Company. Each furnace has 3 Whitwell stoves, 10 x 60 ft., and will use the same fuel and ores as Nos. 1 and 2. A merchant mill is in course of construction. The building, 100 x 400 ft., will contain 1 12-in. roll train, and 1 20-in. roll train; the first driven by a horizontal Hughes & Phillips engine, 22 x 30 in., the second by a horizontal Porter-Allen engine, 32 x 48 in. The heating furnaces are Sweet's patent.

THE LOCHIEL ROLLING MILL COMPANY.—Henry McCormick, president. This company has a capital stock of \$400,000, and employs from 550 to 600 men. The plant consists of a rail train, 19½ in. diameter, driven by a 42 x 42 in. vertical engine. At present it is rolling rails from blooms made by the Pennsylvania Steel Company. The blooms are heated in 8 coal furnaces, and the capacity of the train is 750 rails in 24 hours. Puddle train, 19 in. diameter, driven by a 24 x 48 in. engine, with 12 double puddling furnaces; product, 45 to 50 tons in 24 hours. Bar train, 16 in. diameter, with 2 heating furnaces; product, 22 to 25 tons per day. Guide train, 9 in. diameter, with 1 heating furnace; product, 11 to 15 tons per day. Butt train, 16 in. diameter, with 1 heating furnace; product, 18 to 20 tons per day. The bar, guide and butt trains are driven by 1 engine, 32 x 32 in. Blast Furnace—One stack, 14 x 52 ft., closed top, pipe ovens; fuel, anthracite coal and coke; ores, fossil, Cornwall and Dillsburg and mill cinder; product, 7500 tons per annum.

IRON WORKS OF THE MCCORMICK ESTATE.—Henry McCormick, treasurer. The Harrisburg Nail Works were built in 1810, and located at Fairview, directly opposite Harrisburg, on the Northern Central Railway. The plant consists of 2 roll trains, 19 in. diameter, 1 puddle and 1 nail plate roll trains, 9 double puddling furnaces, 5 heating furnaces, and 75 nail machines. The puddle train is driven by water power, and the nail plate train by a 200-horse-power engine. Product, 10,000 tons of nails, nail plate and muck bar, per year; 350 men and boys employed.

Faxton Rolling Mill was built in 1869 (John Q. Denny, superintendent). It contains 3 roll trains, largest 30 in. diameter, 5 double furnaces, 5 heating furnaces, and 1 steam hammer. The product is 9000 tons per year of boiler, skelp and tank iron; 200 men are employed.

Faxton Blast Furnaces, McCormick & Co.,

—No. 1 stack was built in 1855, 14 x 50 ft. blown by an 84 x 84 in. engine; pipe oven in use, but Whitwell stoves are now in course of construction. The product is 10,000 tons per year. No. 2 stack was built in 1872, 15 x 60 ft.; blown by 84 x 84 in. engine; 3 Whitwell stoves; fuel, anthracite coal and coke; ores, York County, Pa., magnetic, Cornwall, and fossil ore from Juniata County, Pa. The product is 22,000 tons per year; about 300 men are employed at both furnaces.

CHESAPEAKE NAIL WORKS.—Charles L. Bailey & Co. Capital invested \$500,000; employ 300 men, and pay \$165,000 wages annually. The plant consists of 16 single puddling furnaces, 3 heating furnaces, 3 reheating furnaces for nail plates, 2 bluing furnaces, 1 annealing furnace for clinch nails, 1 puddle train, 81 nail machines. The annual product is 10,000 tons muck bar, and 220,000 kegs nails.

CENTRAL IRON WORKS.—Charles L. Bailey, president. Capital \$200,000; employ 120 men, and pay \$100,000 wages annually. The plant consists of 5 double and 1 single puddling furnace, 3 heating furnaces, 1 puddle mill, 1 plate train (3 high rolls), 32 in. diameter, driven by a 36 x 60-in. engine. The product is 8000 tons plate iron and 7000 tons muck bar. Plates 88 in. wide, and ordinary lengths from number 10 to 1½ in. thick are rolled in this mill. This firm is now putting in another plate train, 25 in. diameter, 3 high, driven by a 25 x 60 in. horizontal engine.

HARRISBURG CAR MANUFACTURING CO.—W. T. Hildrup, superintendent. Capital stock, \$500,000; invested in business, \$1,000,000; employs 800 men; amount of monthly pay roll, \$26,000. The number of cars built is 12 to 15, with a daily consumption of 30 tons of charcoal iron, 15 tons of anthracite iron, 40,000 to 45,000 ft. of lumber and 15 tons of bar iron. The average value of cars is \$600, and the total yearly product about \$2,500,000. This company, one of the most prosperous in Harrisburg, has a blast furnace, which is being remodelled. Its sawmill is the largest in the city.

Foundry and Machine Department of the Harrisburg Car Manufacturing Co.—In this establishment are manufactured portable and stationary engines, all kinds of foundry and boiler work, and agricultural implements of various descriptions. Its capacity is one portable engine per day, and 10 tons of foundry castings, also an annual production of 500 corn planters. The number of men employed is 175.

THE WISTER BLAST FURNACE.—This furnace was built in 1867, originally 14 x 45 ft., but recently altered to 14 x 60 ft. It is blown by a 30 x 48 in. horizontal engine, geared to drive two blowing cylinders 72 x 72 in. This engine blows 250 cubic feet of air per stroke, and is capable of running 30 to 35 revolutions per minute, at a pressure of 6 to 7 pounds of blast. There are three batteries of boilers, two of which give ample steam power. Two Kent 8-inch pipe ovens heat the blast to 1000° or 1100° F. Only one oven is blown through, leaving one in reserve. Fuel, ¾ anthracite, ¼ coke; ores, Dillsburg, Seizholtzville, Cornwall, and for two years past, about one-third from Spain and other foreign countries. Capacity, 45 tons per day. This is a very complete furnace, and one of the most successful in the Susquehanna region.

THE LOUISE FURNACE.—W. H. Woodward & Daniel King, proprietors. This furnace was built in 1875, but was not blown in until 1880. The stack is 10 x 50 ft., blown by a 60 x 60 in. horizontal engine, with pipe ovens, built by Raymond & Campbell, of Middletown, Pa. Fuel, anthracite coal and coke; ores, hematite from the Cumberland Valley, and Dillsburg magnetite. The product is from 120 to 130 tons per week.

HUMMEL, FENDRICK & CO.—This firm has lately begun the manufacture of bar iron and tires. The plant consists of a small merchant train and two heating furnaces.

JACKSON MANUFACTURING COMPANY.—James I. Chamberlin, president; James Jenkins, secretary and treasurer. The business of this company, which has recently been reorganized and incorporated, is the manufacture of a wide range of mining implements. At present they manufacture only steel barrows. This product is shipped chiefly into the mining regions of the West, large consignments being constantly made to Pueblo for mining purposes in Colorado. They have also exported quite a large number of barrows. Capital invested, \$50,000; present capacity of works, 15 to 20 steel barrows per day, employing 20 to 25 hands.

HARRISBURG CHAIN WORKS.—Joshua W. Jones, proprietor. This industry has been but recently established in Harrisburg, and the above works are not yet fully completed. At present only 4 furnaces are in operation, but 8 others will soon be erected. The principal product will be chain bars and ties, and the capacity of the works is estimated at 3000 per month. A small Baxter engine is employed to drive a fan for fires, and an oven (8 x 2 x 6 ft.) is used for jpanning the chains. Twelve men are employed.

EAGLE WORKS.—This establishment is owned by Mr. W. O. Hickok, and has been in operation about 25 or 30 years. It embraces a machine shop fitted up for doing all kinds of machine work, an iron foundry, a brass foundry and a woodwork shop, and gives employment to from 60 to 120 men. It has a large local trade; but its principal product is a class of machine work—ruling machines, ruling pens, sawing machines, press boards, table shears, &c.—that is extensively sold in Europe, South America, Cuba and Australia.

HARRISBURG STEAM BOILER WORKS.—These works are owned and operated by Robert Tippet's Sons. They were built in 1863 by Robert Tippet. Their principal business is the manufacture of steam boilers, furnace work, stacks, &c. They ship punched and shaped iron to Ohio, Alabama and Tennessee. The works employ 60 hands, and have a capacity of 30 tons per week.

J. D. MARSHBANK & SON'S WORKS.—These works manufacture steam and hot water fittings, also various descriptions of heavy and light castings. The annual value of their product is \$30,000, and they give employment to 35 hands. In addition to the above, there are numerous other iron industries in Harrisburg. Bay Bros. carry on a general foundry business, with a probable

DUNNING FINISHED STEEL HORSE SHOES.

The most popular Horse Shoe in the world. Will outwear three Iron Shoes.

Dunning Steel Finished Horse Shoes may be ordered in any quantity, packed, assorted sizes to suit, from the following hardware houses:

SIMMONS HARDWARE CO., St. Louis.

HIBBARD, SPENCER & CO., Chicago.

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Send for sample keg, assorted sizes. Full descriptive catalogues sent on application. Manufactured exclusively by

THE CHICAGO STEEL HORSE SHOE CO., Chicago, Ills., U. S. A.
FACTORY AT PULLMAN (NEAR CHICAGO), ILLS.



Are forged from a solid bar of steel. Afford a firm level bearing, thereby securing to the horse the most natural position for comfort and speed. Is a self-cleaning shoe, and will not "ball up." Equally good for summer or winter use. Will prevent horses from "calking" or growing corns. Can be resharpened as readily as an iron shoe.

OPINIONS.

I do not hesitate to give it as my opinion that it combines more excellences than any I have before seen. It provides a solid base under all circumstances, for the horse while standing or traveling; has no rocking motion while the animal is turning, and possesses eleven calks to protect him from falling. I have never seen the inventor of this improvement, but I desire, in the interest of the noblest animal living, to thus thank him for the good his shoe is likely to bring him.

HENRY BERGH,
President the American Society for Prevention of Cruelty to Animals, New York.

Office of North Chicago City R. R. Co.,

Chicago, Feb. 16, 1881.

CHICAGO STEEL HORSE SHOE CO.—Gents: We are using your "Dunning Steel Horse Shoe" on our car horses, and find they last us from three to four months before being worn out. We drive our horses about 16 miles a day—half over cobble stones and balance pavement. We consider them the best shoe made.

M. W. SQUIRES, Supt.

Nos. 56 to 68 W. VAN BUREN ST.,

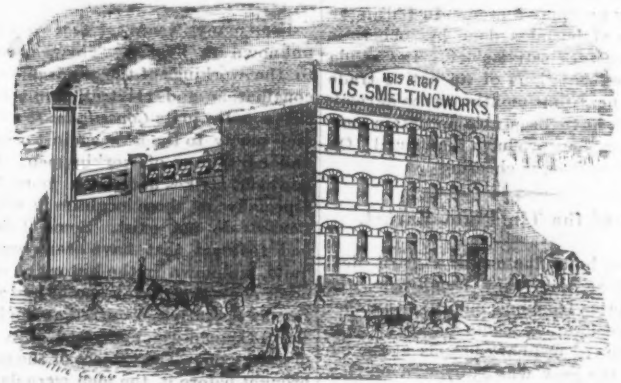
CHICAGO, Feb. 25, 1881.

CHICAGO STEEL HORSE SHOE CO.—Gents: I have used the Dunning Steel Shoe on my horses with great satisfaction. I regard it as the most practical and valuable improvement yet made in Horse Shoes. I am sure they will commend themselves to owners and shoers.

Yours truly,
A. W. KINGSLAND,
Secretary Northwestern Horse Nail Co.

UNITED STATES SMELTING WORKS,

MANUFACTURERS OF



BABBITT AND TYPE METALS,

Brass Castings and Solders of all Kinds.

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Pig Brass and Copper, Spelter, Antimony, &c.

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GEORGE HUNT,

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SOLE MANUFACTURERS OF



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Chain and Rope Goods.

These goods are sold by all leading jobbers in General and Saddlery Hardware at manufacturers' prices.

Send for illustrated catalogue and price list.

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COVERING ALL LOSS OR DAMAGE TO

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ARISING FROM

STEAM BOILER EXPLOSIONS.

The Business of the Company includes all kinds of STEAM BOILERS.

Full information concerning the plan of the Company's operations can be obtained at the

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or at any Agency.

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MANUFACTURERS OF

HARDWARE SPECIALTIES.

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SPECIALTIES: Fluting Machines, Hand Fluters, Planing Machines, Christmas Tree Holders, Bickford Portable Pump, Mrs. Potts' Patent Cold-Handle "Crown" Irons, Ice Cream Freezers and Cake Mixing Machines.



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ESTABLISHED 1868.

Capacity 1000 dozen per day.

GOODS WARRANTED TO GIVE SATISFACTION.

CHAMPION ONE-MAN SAW



WITH PATENT ADJUSTABLE ATTACHMENT. The only Saw that can be adjusted for either a One-Man or a Two-Man Saw. We make the following lengths, 3½, 4, 4½, 5 feet. Send for sample.

WHEELER, MADDEN & CLEMSON MFG. CO., Middletown, N. Y.

HARVEY W. PEACE, VULCAN SAW WORKS

BROOKLYN, E. D., N. Y.,

Manufacturer of First Quality

HAND, PANEL, AND RIP SAWS,

AND KINDRED GOODS;

Also, MILL, CROSS-CUT AND CIRCULAR SAWS.

BAND SAWS A SPECIALTY.

MAD MULLER.



Mad Muller, on a summer's day
Raked the meadows sweet with hay.
Beneath his straw hat glowed a glare
That filled with brimstone the morning air.
Sneering he worked, till his oaths so free
Frightened the birds from bush and tree.
His breath gave out and he took a rest,
But a longing for vengeance filled his breast.
A wish that his tongue was free to own
That something better than he had known
Would keep his hogs at bay and morn,
From rooting the seed from his fields of corn.
A neighbor drove slowly down that way
And stopped, just to pass the time of day.
He drew his reins in the oak tree shade,
And, looking around him, slowly said—



"What makes you stand such rooting and things,
When to stop if you only need HILL'S Hog Rings?"
Mad Muller listened, a glad surprise
Beamed from his lately blazing eyes.
He bought the rings and he tried them on,
And a victory over those hogs he won.
No longer as mad a fiend was he,
As he walked abroad his corn to see,
For each big hog, with a ring in his snout,
Was slowly and harmlessly grunting about.
And the corn it sprouted and bravely grew,
And made a big crop, as corn should do.
And as he looks at his fields, he sings,
Softly whispers "It might have been
That I in the fall would have no corn to show
Had HILL'S Hog Rings (Triangular) not helped
me so."
And to all of his neighbors the praise he sings,
Of the man who invented those blessed Hog Rings.



100,000,000

OF HILL'S TRIANGULAR HOG RINGS have been sold in nine years, consuming 550,000 pounds of wire, measuring 3400 miles.

H. W. HILL & CO., Decatur, Ill.

H. W. HILL & CO.,

THE HARTFORD HAMMER CO.,
Manufacturers of

Solid Cast-Steel Hammers
HARTFORD, CONN., U. S. A.

For sale by C. E. JENNINGS & CO., 96 Chambers St., New York, and the trade generally.

NATIONAL HARDWARE & MALLEABLE IRON WORKS,

Lehigh Avenue, American and Third Streets, Philadelphia.

THOS. J. DEVLIN & CO.,

MALLEABLE, FINE GRAY IRON AND STEEL CASTINGS made from patterns to order. Special attention given to Tinning, Bronzing, Coppering, Japanning and Fitting. A large line of Carriage and Wagon Castings constantly on hand for the trade.

COAL TIME SAVED! BY USING MORGAN'S Variable Blast Tuyere Iron

This cut represents the interior of the Tuyere, showing the rotating air tubes through which four different sized currents of air may be passed, thereby making any sized fire from two to 15 inches in diameter; for instance, if a large fire is being used and the next job should be a nail rod, we do not move or burn the large bed of coal,



but turn the small tube up and so concentrate the heat to the point desired.

The constant flow of water keeps the Tuyere cool and prevents cinders or clinkers from forming in the fire. To prevent the water from freezing in the pipes, the barrel is supplied with a faucet that empties the pipes but not the barrel. All the dirt from the fire sifts through the perforated fire cap into the dirt box, from which it is blown by the blast when the ball valve is raised for that purpose. I also furnish Tuyere Irons without water attachment. See first issue of the month.

After having used your "Variable Blast Tuyere Iron" three months, I pronounce it perfect in every respect, and it actually saves from 25 to 50 per cent. of the coal. CHAS. VAN HORN, Earlville, Ill.

Send for price list and discount.
A. W. MORGAN, Patentee and Manufacturer,
Office, 52 Vance Block, Indianapolis.

WITHEROW & GORDON,
Engineers & Contractors,
PITTSBURGH, PA.

Sole Agents for the
WHITWELL
HOT BLAST STOVES.
OVER 600 IN USE.

The following parties either have them in use or under construction:
Cedar Point Iron Co., N. Y.
Dunbar Furnace Co., Pa.
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Chester Rolling Mill Co., Pa.
Davenport, Fairbairn & Co., Pa.
Isabella Furnace Co., Pa.
Paxton Furnaces, Pa.
Spearman Iron Co., Pa.
Erie Iron Works, Ohio.
Milton Coal and Iron Co., Ohio.
Winona Furnace Co., Ohio.
Woods & Marshall, Ohio.
H. Campbell & Sons, Ohio.
Rocking Valley Iron Co., Ohio.
Cleveland Rolling Mill Co., Ohio.
Meyer Iron Co., Ill.
North Chicago Steel Co., Ill.
Union Iron and Steel Co., Ill.
Means & Culbertson, Ky.
Ashland Furnace Co., Ky.
Norton Iron Co., Ky.
Southern States C. I. and S. Co., Tenn.
Sewanee Furnace Co., Tenn.
James C. Warner, Rising Fawn, Ga.
Ohio Iron Co., Zanesville, O.
Sloss Furnace Co., Ala.



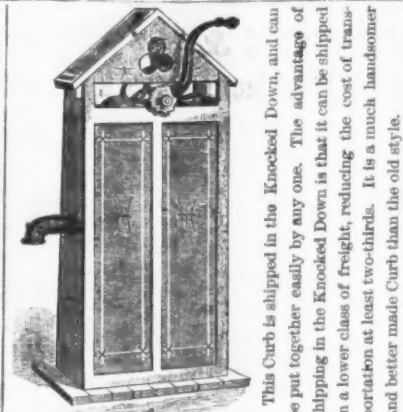
ZERO
REFRIGERATOR.
with Water, Wine and Milk Cooler, Best Food and Ice Preserver in the world. See Book. A. M. LESLEY, 350 Sixth Avenue, Also the Rotunda Fair place.

HUBBELL'S
PATENT
METAL
CORNERS
FOR OIL CLOTH,
With Binding to Match.
Protect them from wearing and are ornamental. These goods need only be seen by the public; the real merits are at once appreciated. Sample orders solicited and circulars sent on application.

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Patentee and Sole Mfr. in U. S. and Canada,
Northville, Fulton Co., N. Y.

VERMONT SNATH CO.,
Manufacturers of
Pat. Swing Socket Snaths
and also a large variety of other styles of Snaths
Springfield, Vermont.
Represented in New York by Lamson & Goodnow Mfg. Co.

B. FITTS PATENT MAGNETIC
METAL SEPARATOR,
Manufactured by
EZRA SAWYER,
33 Hermon St., WORCESTER, MASS.



A. WYCKOFF, Manufacturer,
Chain Pump, Tube, & Co.,
ELMIRA, N. Y.

A NEW PATENT WEDGE GRIP
FOR TESTING MACHINE.

H. B. Riché, of the firm of Riché Bros., Philadelphia, has just received Letters Patent for a very simple, but ingenious, improvement in a Testing Machine, doing away with the unsatisfactory ball and socket and round back lines, which have proved failures. It consists in slightly elevating the biting face of wedge through its center longitudinally. It will be seen at a glance that this will render it an impossibility to tear or twist the specimen in process of testing. This improvement, together with those already contained in this make of Testing Machines, makes them unrivalled. Attachments for obtaining elongation and the limit of elasticity of specimens furnished at slight cost.



Tree and Hedge Trimmer.
Unsurpassed for cheapness and durability. Unlike any other make, it combines a perfect lever principle with a blade working in a slotted steel hook.
Send for illustrated circular and price list.
E. S. LEE & CO.,
164 West Main St., Rochester, N. Y.

Grindstones, Emery, &c.
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Berea, O., Nova Scotia, & other brands
283 and 285 Front Street, New York.

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The largest manufacturer in the world of
OIL STONE
Of all description.
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Send for Illustrated Price List. **NEW YORK.**

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Manufacturers of
GRINDSTONES
Of All Kinds.
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Manufacturers of
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OHIO GRINDSTONES.
Superior Ohio Grindstones, manufactured by F. L. Cole, Constitution, Ohio, will be supplied to the Southern trade at lowest possible rates by
S. B. LOWE, Southern Agent,
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NEWCASTLE GRINDSTONES
(ENGLAND).
Celebrated for their uniform quality and keen rasping grit, have now a world-wide reputation.
For prices apply to
R. ATKINSON & CO.,
Manufacturers,
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EMERY.
Large stock on hand, especially suited to Saw and Shovel Manufacturers, at bottom prices.
Importers and Manufacturers of
PURE TURKISH EMERY.
IRVINE, TOWNSEND & CO.,
123 Chambers St., New York.
Send for quotations and samples.

"Climax" BARREL TANK ATTACHMENTS.



"Climax"

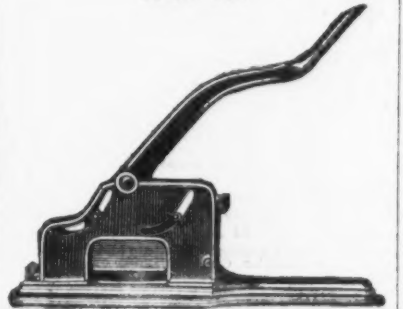
is designed to be attached to any Barrel or Cask, thereby converting the same into a temporary Tank, fitted with an effective Pump, and while protecting contents from dirt and waste, the owner has entire control of same, by simply locking the cover. It entirely does away with the labor and waste attendant upon emptying Barrels into any of the numerous Metal Tanks, while securing all the convenience of the same, at a greatly reduced cost. The Apparatus can be adjusted in a few moments to a Barrel of any size, and as quickly shifted to another when contents are exhausted, the process of connecting being very simple. It is so compact in form as to be consistent with perfect efficiency, and we feel confident that a trial will demonstrate its practical value.

WHO HAS USE FOR IT?
EVERY ONE
Who buys in bulk any of the various kinds of Oils, or in fact any Fluid that can be Pumped;

Every Mill, Factory, or Work-Shop, where Oils or other fluids are used, and every store where such fluids are retailed, will find the "CLIMAX" just what they require.

PANCOAST & MAULE,
Nos. 243 & 245 SO. THIRD STREET,
PHILADELPHIA, PA.

Acme Tobacco Cutter NO. 10.



Manufactured by
F. F. Adams & Co., Limited
ERIE, PA.

The Iron-Masters' LABORATORY.

Exclusively for the
Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestone, Clays, Slags and Coal for Practical Metallurgical Purposes.
No. 339 Walnut St., Philadelphia.
With Branch at Warrenton, Virginia.
J. HODGETT BRITTON.

This laboratory was established in 1866, at the instance of a number of practical Iron Masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes. The object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

CHARGES TO IRON WORKS.
For determining the per cent. of Pure Iron in an ordinary Ore..... \$4.00
For the per cent. of Pure Iron, Sulphur and Phosphorus in do..... 12.50
For each additional constituent of usual occurrence..... 1.50
For those of unusual occurrence or difficult to determine, the charge must necessarily depend upon circumstances.
For determining the per cent. of Sulphur or Phosphorus in Iron or Steel..... 7.00
For each additional constituent of usual occurrence..... 6.00
For the per cent. of Carbonate of Lime, and insoluble Silicious Matter in a Limestone..... 10.00
For each additional constituent..... 2.00
For the per cent. of Water, Volatile Combustible Matter, fixed Carbon, and Ash in Coal..... 12.50
For determining the constituents of a Clay, Slag, Coke, or of an Ash in Coal the charges will correspond with those for the constituents of an ore.
For a written opinion or letter of instruction the charge must necessarily depend upon circumstances.
Printed instructions for obtaining proper average samples for analysis furnished upon application.

annual capacity of 500 tons. The Wilson Manufacturing Company are manufacturers of agricultural implements, and make a variety of castings.

HARRISBURG FIRE BRICK WORKS.—George W. Buehler, treasurer. These works were built in 1869 and have been in successful operation since that date. They manufacture fire-brick for blast furnaces, steel works and rolling mill use, and have a capacity of 2,000,000 bricks per annum, which amount could be readily increased. The clays used are from the several well-known deposits in New Jersey, and from Clearfield, Clinton, Dauphin and Lebanon Counties, in Pennsylvania. All the fire-bricks are made of these several clays combined in various proportions, as best suits the intended use. A 40 horse power engine is employed in grinding and mixing the clays. The works give employment to 30 hands.

HYDRAULIC CEMENT PIPE WORKS.—Henry J. Beatty, proprietor. These works have been in successful operation during the past 18 months, manufacturing cement drain pipes and cement ware or artificial stone. The product is sold throughout the whole of Central Pennsylvania. The capacity of the works is 25,000 ft. of drain pipe per annum. The capital invested is \$15,000, and the works give employment to 12 men.

HARRISBURG COTTON MILL.—Geo. Calder, Jr., proprietor. This mill was built some 25 years ago. It has 8000 spindles and 230 looms, with a capacity of 2700 bales cotton, producing chevots, drilling, four-shaft twills, duck, warps, yarns, &c. The number of hands employed is 260, and the monthly pay-roll amounts to \$4500.

The lumber and saw-mill interests are quite large in Harrisburg and vicinity, and there are two large saw, door and blind factories. There are also two flouring mills, owned by the McCormick estate—the Paxton Mill, with a capacity of 400 barrels per day by the new process, and the Lochiel Mill, with a capacity of 100 barrels per day.

BRUSH, McCULLOCH & Co.—This firm have recently begun the manufacture of handles for axes, picks, &c. Capacity, 150 dozen handles per day. Employ 40 men.

The chairman thanked Mr. Chauvenet for the valuable information contained in his paper, and hoped the example would be imitated in other cities. He then introduced Mr. E. Windsor Richards, who, by invitation of the council, had consented to give some account of his experience with the basic process. Mr. Richards' remarks contained no new facts, but they described the aims and methods of the process very clearly, and were listened to with the greatest interest. As an understanding of what he said depends upon the reproduction of some of Mr. Richards' blackboard sketches, your correspondent is unable to send it in shape for publication at this late hour. The following is the programme for the remainder of the meeting:

Wednesday.
There will be a morning session for papers and discussions at 9 a.m. At 11.15 a.m. the members will take an excursion train, provided by the Pennsylvania Railroad, to visit the Pennsylvania Steel Works, Lochiel Rolling Mill, Paxton Furnace, Paxton Rolling Mill, Central Iron Works, Chesapeake Nail Works and Harrisburg Car Manufacturing Company's works. They will be entertained at lunch at Steelton by the Pennsylvania Steel Company. In the evening they will be given a reception by the citizens of Harrisburg at the Governor's mansion.

Thursday.
At 9 a.m. the institute takes an excursion train to visit the hematite ore mines of the Philadelphia and Reading Coal and Iron Company, the Carlisle Iron works, the hematite ore mines on the South Mountain Railroad, Laurel Forge and Pine Grove Furnace, lunching at Pine Grove, as the guests of Mr. J. C. Fuller. Returning they will visit the Indian School at Carlisle, reaching Harrisburg in time for an evening session.

Friday.
There will be a morning session for papers and discussion, followed by an excursion to Coal Brook Furnaces and the Cornwall Ore Banks, with lunch at Lebanon as the guests of the Cornwall Ore Bank Co. In the evening the members will be entertained by a complimentary dinner tendered them by the Pennsylvania Steel Company. This will end the meeting, which, as will be seen, is full of interest.

NEW PUBLICATIONS.

ENGINEER'S POCKET BOOK, for 1882. By Mr. P. Stübgen, Deutz, Germany. Essen: Baedeker.

This little volume has appeared annually for the last seventeen years, and has met with the entire approval of the engineering profession. The success of the undertaking has encouraged the author in his laudable efforts for the diffusion of important information regarding mechanics, architecture, steam engines, boilers, &c. In the present edition valuable additions have been made, comprising metallurgical data, and the classification of iron and steel conforming with the resolutions adopted by the "Verein deutscher Eisenhüttenleute." Heating and ventilating, as well as the subject of windmills and the dynamometrical determinations of power, have also been treated of more extensively than has been the case heretofore. An inspection of the little book is advisable, and will more fully convince the reader of its merits.

THE MEINERSCHAF SYSTEM. A simple and practical method of learning to speak French, German, Spanish and Italian. By Dr. Richard R. Rosenthal. New York: L. K. Funk & Co.

Dr. Rosenthal, unlike other linguists, proposes to appeal directly to the ear, the tongue and the memory, instead of appealing to intelligence, which, though it superintends the whole process of mastering foreign sounds, can only really be said to come into action when these have become our mental and bodily property so fully and entirely that we begin to think in them just as readily as in our own vernacular. His system combines the good features of all modern methods, and follows at the same time nature's own way as closely as possible. A glance at the first few pages of the lessons will show how he teaches the student

to think in foreign languages themselves, and his rules, strictly followed, will undoubtedly lead to the most perfect success, as proved by the experience of thousands of his pupils.

LABOR AND WAGES.

A committee from the Knights of Labor, on the 20th, waited on the bottle and window glass manufacturers, of Pittsburgh, and gave notice that the "fillers-in" and "teasers" demanded an advance of 15 per cent. in wages. Unless their demand was acceded to they were to quit work the next morning. The strike, however, was a short one. Saturday there was a meeting and the difficulty was amicably adjusted, the men returning to work at an advance of \$1 per week.

The South Side tableware manufacturers of Pittsburgh have voluntarily advanced the wages of their employees 10 per cent.

In the Quarter Sessions Court of Philadelphia, on the 21st inst., Judge Allison presiding, Eugene Vallette, Thomas S. Coon and Daniel McNamara were heard on a writ of habeas corpus, the charge against them being conspiracy. They were a committee appointed by the Typographical Union after a resolution by the union that certain rates should be increased from \$14 to \$16 a week, and they visited in connection therewith the office of Sherman & Co., in Philadelphia. They were there informed that the rates would not be increased, and they then went to the fifth floor, where was the composing room, and, through the chairman of the office, ordered a strike unless the rates were paid. For this they were arrested and charged with conspiring to molest, intimidate and annoy Sherman & Co. in their business. At the close of the argument the Judge said he had a clear notion in his mind how the case ought to be decided, but he would take time to look at the law before giving an opinion.

The strike at the rolling mills of Cincinnati continues, and the men who are out are firm in their demands for an increase in wages over Pittsburgh prices. A conference was held at the office of Mitchell, Tranter & Co., on the 21st, between the union and mill owners, for the purpose of coming to an understanding, if possible, in reference to the scale of prices to be paid. The union was represented by two men from each department, and the mills by two delegates each. The delegates from the mills stated positively beforehand that they should not go above Pittsburgh prices, and if the men were willing to concede to that decision, they could go to work next Monday, otherwise they would keep on bringing men from the East, and if they could not supply the mills in this way they would shut down for the winter. The delegates from the union were instructed to accept nothing less than 10 per cent. above Pittsburgh for heaters, but were empowered to make special agreements for some of the other departments. Consequently both sides went into the conference with very little hope that anything would be accomplished. The conference convened at ten o'clock, and continued, with a slight intermission for dinner, until after five o'clock, but nothing was accomplished, and no agreement arrived at in any part of the schedule of prices, and the meeting adjourned. Mill owners have another batch of 36 men coming from the East, which they expect to put to work, probably in the Globe mill. The Riverside mill is running, apparently without any objection, and some of the men who have left the Dayton mill work there.

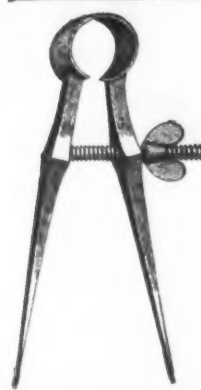
The laborers on the Pittsburgh, McKeesport and Youghiogheny Railroad, who struck for an advance of 15 cents per day last week, have resumed at the old figures.

The Wheeling bricklayers and hod-carriers have struck against the employment of non-union men.

False Representations to a Commercial Agency.—The eighty-third volume of New York Reports, just published, contains a decision by the Court of Appeals of much practical interest and importance to the mercantile community. It appeared that the plaintiffs had sold goods on credit to a firm on the report of its financial standing obtained from the commercial agency of Dun, Barlow & Co. This report, which was based on information given to the agency by the defendant, a member of the firm, was found to be false. Thereupon an action for deceit was begun against the defendant. The latter claimed that he was not liable, because the representations as to the standing of his firm had not been made directly to the selling house. The Court of Appeals holds that this is no defence, and that an action can be maintained against a person making false representations to a commercial agency by any subscriber to the agency who has been thereby deceived. "If a person," says the opinion, "furnishes to such an agency a willfully false statement of his circumstances or pecuniary ability with intent to obtain a standing and credit to which he knows he is not justly entitled, and thus to defraud whoever may resort to the agency, and, in reliance upon the false information there lodged, extend a credit to him, there is no reason why his liability to any party defrauded by these means should not be the same as if he had made the false representation directly to the party injured."

The Mayor of Philadelphia, in consequence of the recent lamentable loss of life by the burning of a woolen mill in that city, has issued an order to the owner or owner's tenants or agents of all factories, manufacturing or workshops of any kind in which operators or employees are employed at work, requiring them immediately to provide and cause to be fixed to their several buildings permanent fire escapes.

Advices from Rio to the 15th ult. state that the Bank of Brazil had adopted the following rates of interest for money deposited: By bills at two and three months, 2½ per cent. per annum; by bills at four and five months, 3 per cent. per annum; by bills six and seven months, 3½ per cent. per annum; by bills at twelve months, 4 per cent. per annum.



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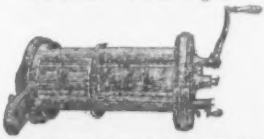
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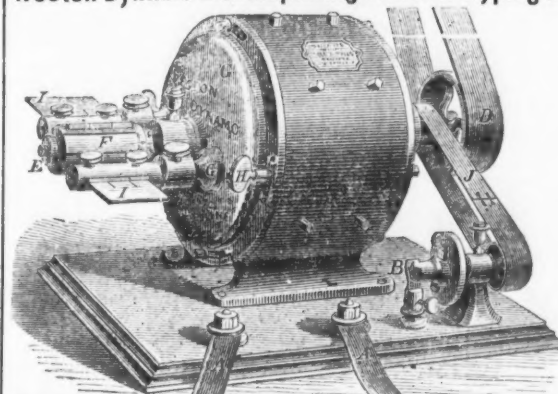
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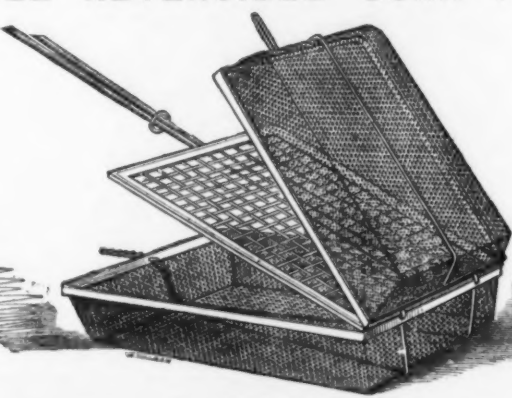
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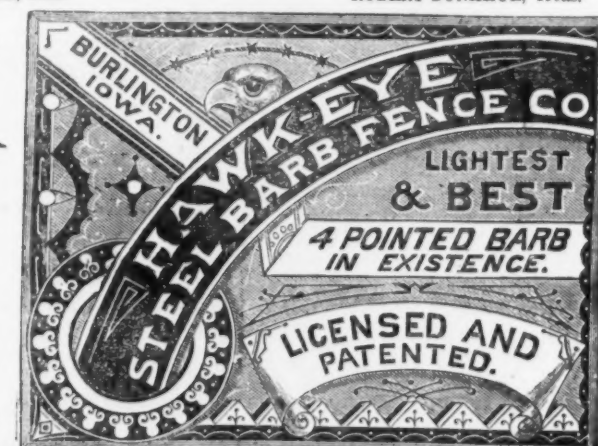
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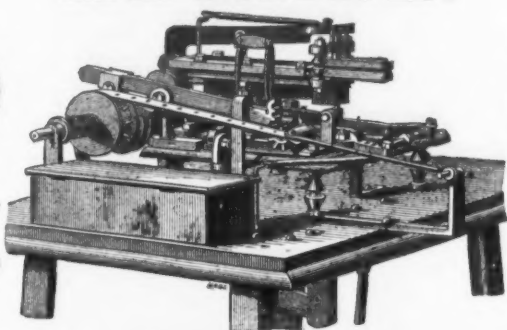


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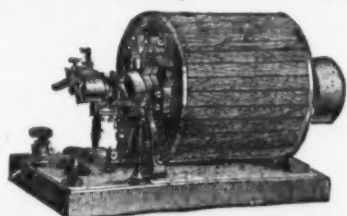
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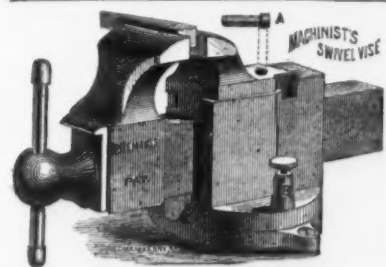
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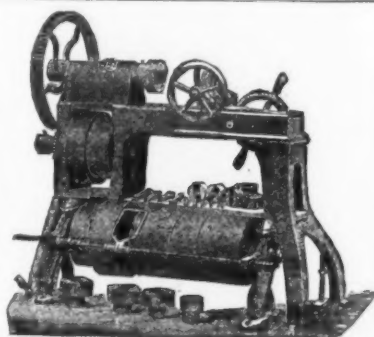
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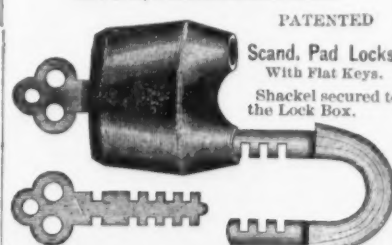
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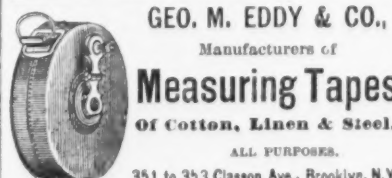
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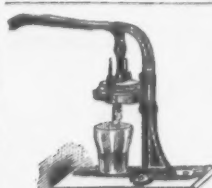
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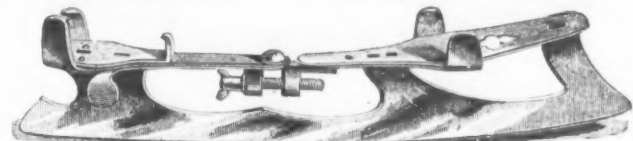
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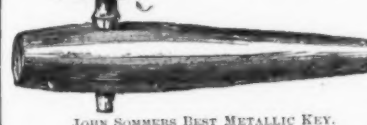
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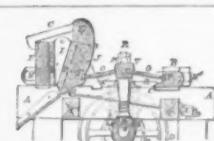
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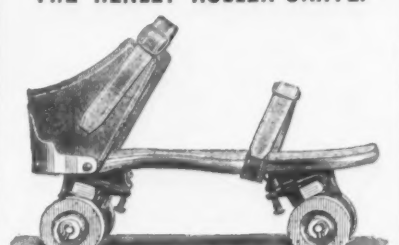
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With which the Sashes work as
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Sashes are locked with the meet-
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Discount to the trade. In use over
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Trade Report.

Office of THE IRON AGE,
Wednesday Evening Oct. 26, 1881.

The growing ease in the money market is the most notable change coming under observation in the week's review. The heavy drain of loanable funds, caused by the demands of speculators in the West, has measurably ceased, the rates of exchange on New York at St. Louis and Chicago having declined from 50 @ 80 cents discount to about par. The easier condition noticed was further enhanced by the announcement, on Thursday evening, that the Treasury was prepared to pay on presentation any of the extended 6% bonds embraced in the 105th call, amounting to about \$13,000,000. The gain in the bank reserves, as shown in the weekly statement, had a reassuring effect.

At the Stock Exchange, United States bonds were strong at an advance for the extended 5s, under the impetus of the Secretary's offer to purchase the 6s, as noted above, the rise being in large part due to purchases by the national banks. On Monday the principal dealings were in extended 5s, which advanced to 101½ @ 101½; the 4s and extended 6s also advanced. The market was favorably affected by the announcement that Ex-Governor Morgan had been nominated and confirmed as Secretary of the Treasury, under a belief that he would accept the position. The share market started off strong, and the extended 5s advanced to 101½ @ 101½. On Tuesday the news that the Pennsylvania Railroad and the Baltimore and Ohio had each advanced passenger rates, and that the Vanderbilt roads had responded to some extent by advancing rates on East-bound freight, caused a rise in trunk-line shares. Subsequently, when it became known that Governor Morgan declined to accept the proffered position, there was a partial reaction.

The elevated railroad agreement was ratified on Monday by the three Boards of Directors. Dividends to Metropolitan and New York stockholders will begin January 1, but will be paid on only such certificates as have been sent in and stamped under a modified lease.

With the close of the week the market for foreign exchange is dull and rather heavy. The posted rates for prime bankers' sterling are 4.81½ and 4.85½; the actual rates are 4.80½ @ 4.81 and 4.84½ @ 4.85, with cable transfers 4.85½ @ 4.86 and prime commercial bills, 4.78½ @ 4.79½. In the money market 5 @ 6% is the quotation for call loans on stocks, and about 1% lower on United States bonds. The bottom rate for time loans on stocks is 6%. Prime mercantile paper is 6 @ 7%.

The export movement of domestic produce from this port during the past week shows no improvement as compared with the past few weeks. The total is \$6,599,674, compared with \$8,324,715 for the same week last year. In general trade, a good business is in progress, accelerated in some departments by the approaching close of navigation. The prevailing activity is well indicated by the magnitude of the Clearing House exchanges, outside of New York, which were never larger than during the present month.

As above noted, the stock market is generally advanced, compared with one week ago, closing strong and buoyant, with the Vanderbilt stocks special features. The principal changes are as follows:

Advanced	Y. N. C.	Union Pacific	St. Paul	Chicago and Alton	Delaware, Lack. and Western	Delaware & Hudson	Central Pacific	Ohio Central	Lake Erie & West.	Lake Shore
1881.	1881.	1881.	1881.	1881.	1881.	1881.	1881.	1881.	1881.	1881.
Oct. 21	Oct. 21	Oct. 21	Oct. 21	Oct. 21	Oct. 21	Oct. 21	Oct. 21	Oct. 21	Oct. 21	Oct. 21
Oct. 27	Oct. 27	Oct. 27	Oct. 27	Oct. 27	Oct. 27	Oct. 27	Oct. 27	Oct. 27	Oct. 27	Oct. 27

The importations of specie and bullion at this port during the week ending Oct. 21 were \$1,620,938, consisting of \$1,571,645 in gold and \$49,293 in silver, as against a total of \$6,238,548 for the week ending Oct. 23 last year. The importations since the 1st of January and since the 1st of August compare as follows with the movement during the corresponding periods last year:

Since January 1, 1881.	1881.	1880.
Gold	\$4,916,573	\$4,168,395
Silver	2,856,896	4,140,041
Total	\$7,773,469	\$8,308,436
Since August 1, 1881.	1881.	1880.
Gold	\$1,392,113	\$4,194,088
Silver	595,347	416,535
Total	\$1,987,460	\$4,610,623

The bank return for the week shows a gain of \$4,430,150 in reserve, which now stands at \$1,907,275 above, against \$3,565,450 above at this time last year. The loans show a loss of 7,038,400.

Government bonds at the close were strong at the following quotations:

U. S. 4½% 1891 registered	112½	112½
U. S. 4½% 1891 coupon	112½	112½
U. S. 4½% 1897 registered	110	110
U. S. 4½% 1897 coupon	110	110
U. S. Currency 6s 1891	130	130
U. S. Currency 6s 1896	130½	130½
U. S. Currency 6s 1897	131	131
U. S. Currency 6s 1900	134	134
Sixes continued	100½	100½
Fives continued	101½	101½

The following is an analysis of the bank totals of this week compared with that of last week:

	Oct. 25.	Oct. 22.	Comparison.
Loans	\$318,148,900	\$311,310,500	Inc. \$7,038,400
Specie	54,807,200	58,359,400	Dec. 3,552,200
Legal T'd's	15,774,500	15,208,700	Inc. 565,800
Total reserve	69,931,700	73,878,000	Dec. 3,946,300
Deposits	299,078,300	286,643,300	Inc. 12,435,000
Reserve required	78,504,575	71,660,825	Dec. 6,843,750
Surplus	2,522,875	1,907,275	Inc. 615,600
Circulation	19,896,100	19,919,000	Dec. 22,900
Deficiency			

The following were the closing quotations for mining stocks:

	Bid.	Asked.
American Flag	13	13
Amie	25	27
Alcon	6.00	6.00
Alta Mont.	1.80	1.80
Bodie	6.75	7.00
Bull Dog	80	80
Big Pittsburgh	85	90
Calaveras	12	12
California	75	80
Consolidated Imperial	18	18
Consolidated Virginia	2.25	2.35
Chrysolite	6.75	6.75
Cent. Ariz.	1.20	1.20
Cherokee	1.20	1.20
Dahlonga	5	6
Dunderberg	60	60
Dardanel	10.00	10.00
Eureka C.	10.75	10.75
G. Placer	39	39
Granville	3	4
Great Eastern	11	11
Green Mountain	5.00	5.00
Hukill	67	70
Horn Silver	17.00	17.00
Hibernia	38	33
Iron Silver	2.00	2.00
Little Pitts.	2.50	2.50
L. Chief	1.00	1.00
Marquette	1.30	1.30
Mar. Pref.	1.00	1.00
Moore	1.00	1.00
Miner Boy	43	43
Nor. Belle	11.00	11.00
N. Bell	13.37½	13.37½
Robinson	13.37½	13.37½
S. Nevada	14.62½	14.62½
Silver Cliff	3.45	3.45
Sutro	3.55	3.55
Spr'g Val.	3.75	3.75
St. L. and 4.	70	70
St. L. and 3.	3.70	3.70
Tip Top	6.00	6.00
Tuscarora	3	4
Union Con.	13.25	13.25
Unadilla	8	8

GENERAL HARDWARE.

During the week under review no changes in values have transpired; the tone of the market continues firm and the volume of business satisfactory. Foreign Hardware is in fair request at unchanged figures.

The demand for Nails during the week was fair and the tone of the market, as regards price, decidedly strong. We continue to quote 10d. to 60d., \$3.30 @ \$3.40 per keg, net, according to size of order.

Bissell & Welles announce, in an advertisement on the opposite page, that they will sell at auction at their salesrooms, Nos. 83 Chambers and 65 Reade streets, on Tuesday, November 1st, at 10 a.m., a large line of Table Cutlery, seconds, also Carvers, Butchers' Knives, Pearl-handle Tea and Table Knives, Plated Spoons, Forks, &c. Further particulars will be found in the advertisement referred to.

We have received the following circular:

STAMPED WARE MANUFACTURERS' ASSOCIATION
OF THE UNITED STATES
90 Beekman street,
New York, October 17, 1881.

At the regular quarterly meeting of this association, held at the Southern Hotel, St. Louis, on the 12th and 13th inst., it was Resolved, That the thanks of the Stamped Ware Manufacturers' Association are hereby tendered to the jobbers for the spirit in which they have maintained the established prices of the association, and the actuary be instructed to convey to them the expression of our appreciation of their efforts for the common good.

O. W. GRAVES,
Actuary.

BRITISH IRON MARKET.

[Special Report by Cable to The Iron Age.]
LONDON, Oct. 26, 1881.

Scotch Pig.—Prices continue to decline in a fluctuating way, and to-day's quotations are 2½ lower for Glengarnock, and 1½ for Gartsherrie, Coltness and Eglinton. The following are to-day's prices:

Gartsherrie, alongside, Glasgow	59/6
Coltness	60/6
Glengarnock	59/6
Eglinton	59/6

Lighterage from Ardrossan to Glasgow is 9/ @ 2½ per ton.

Bessemer Pig.—The demand is large and prices are firm. Lots of equal portions of Nos. 1, 2 and 3 are quoted 60/.

Manufactured Iron.—Business has been good during the week and prices are firmer. Best Staffordshire Bars are quoted £7. 10/ @ £8.

Steel Rails.—Prices rule firm under the large demand. Quotations for ordinary sections unchanged, viz.: £6. 5/ @ £6. 10/.

Iron Rails.—Transactions have been fair and prices firmer, with quotations unchanged. We quote Welsh, £5. 5/ @ £5. 10/.

Old Rails.—But little business is doing, the offerings being light and sales small. Prices are firm. We quote Old Tees, c. i. f. United States ports, £4. 10/.

Scrap.—Offerings are moderate and sales fair. Prices are firmer. Wrought is quoted £3. 15/ c. i. f. United States ports.

Freights.—Steam freights from Glasgow to New York, 11/.

IRON.

American Pig.—The deliveries of Pig Iron on old contracts continue on a very heavy scale, but new transactions, except in small lots for early delivery, are not large. The tone of the market is strong, and favorite brands are in short supply. We continue to quote: Foundry No. 1, \$25 @ \$26; Foundry No. 2, \$23; Gray Forge, \$21 @ \$21.50.

Scotch Pig.—Business in Scotch Iron has been fairly active during the week, and sales are reported of 300 tons Glengarnock

at about our quotations, 100 tons Carnbroe at \$24.75, 500 tons Summerlee and Coltness at current figures, and several fair-sized lots of Gartsherrie the particulars of which have not transpired. The arrivals of Pig Iron at this port are very large, but more than three-fourths of it is Hematite Pig for use in the manufacture of Steel Rails, and not, as many suppose, the ordinary Irons of commerce. We quote: Eglinton, \$23.50 @ \$24; Carnbroe, \$24.75; Coltness, \$26.50; Glengarnock, \$25; Gartsherrie, \$25 @ \$25.50. Langloan and Summerlee, \$26.

Rails.—The inquiry for Steel Rails is active, and negotiations are pending for a large lot of foreign for earlier delivery than domestic mills can supply. It is difficult to name anything like an exact price for Rails, as the time of delivery is an important factor in the estimate; 1882 delivery is generally quoted about \$60 for ordinary sections, but as the product of the coming year is, to a great extent, already under contract, the figures mentioned may be understood to apply to the last half of 1882; for earlier deliveries, from \$61 to \$65, at mill, is asked. No new business in Iron Rails has come to our notice, and we continue to quote them \$48 @ \$50, at mill.

Old Rails.—During the week sales have been reported of 3000 tons Double Heads at \$30 @ \$31; 1000 tons Old Bridge Rails at \$31, and 2000 tons T's at \$28. There is a fair amount of inquiry, and since the above-named sales were made the tone of the market has strengthened. Old T's are quoted to-day, \$28.50 @ \$29, and D. H., \$31.50 @ \$32.

Scrap.—The demand for Wrought Scrap has been active, and spot lots have nearly all been absorbed. A sale is reported of 200 tons foreign Scrap (a mixed lot) at \$30, from store. We quote Foreign Scrap, \$31, ex store, and for prime selected, from yard, \$32.50 is asked.

Manufactured.—The demand for all descriptions of Manufactured Iron continues active, and we hear of great difficulty being experienced in filling orders on account of incomplete assortments. Refined Bars from store have been advanced 1-10¢ per lb. during the week, and are now quoted 2.9¢, with the tendency still upward.

METALS.

Copper.—Sales of Lake Superior Copper during the week have not exceeded 150,000 pounds at 18¢ @ 18¼¢, which is the quotation at the close. Consumption continues to make good headway, but manufacturers are sufficiently stocked still, and they are in hopes that by the time they will be compelled to replenish, Copper may again have dropped to a much lower figure. Whether in this they will be disappointed or not cannot be foreseen at present. One thing is certain, and that is that speculation for a rise in Metals, and in Copper and Tin in particular, has been considerably interfered with on the other side by the rising discount, which in its turn receives its impulse upward from the gold drain. This latter, it appears, not only Westward, but is now also Eastward, for, strange to say, Austria, a country on the silver basis, also draws large amounts of gold from London and Paris, not to speak of Italy, which has done so for some time past, and will continue to do so for a couple of years to come. We thus witness the curious spectacle of the leading precious metal, gold, being an indirect check on a further upward movement in the base metals, through the intervention of the discount availed of to moderate the outflow of gold from Western Europe. In former times a rising discount only meant tight money, now it means for the moment, in that part of the world at least, a gradual loss of gold. In one respect this check upon mere speculation is a boon, for it has prevented the inauguration of a "boom" that had been counted upon by many on both sides the Atlantic. London quotes per cable, Best Selected, £70; and Chili Bars, £63. 10/.

"London, Oct. 8.—This market remains fairly firm, but with a few parcels of Chili Bars, however, have been sold at somewhat lower rates; but sellers, as a rule, do not press sales, evidently believing that with the vast improvement in statistics higher prices must shortly be realized. A few sales at a shade under current rates need cause no anxiety; in fact, they may be rather anticipated than otherwise, for there are many holders who have been burdened with their Copper for such a long time past that upon each successive rise fresh sellers will doubtless exist, while many holders may even be willing to sell at the best obtainable rates rather than to hold on any longer, in case any adverse feature should arise whereby the market might give way." Manufacturers are quoted as under: Pit and Hot-rolled Flat Bottoms, 29¢ per pound; Cold-rolled Flat Bottoms and Flat Bottoms, with flange cut, 30¢; Braziers, 28¢ @ 34¢, as to size and weight; Circles, 31¢ @ 34¢; Sheets, 28¢ @ 31¢; Sheathing, 26¢, and Bolt Copper, 28¢.

Tin.—Our market has been rather quiet since our last, brought about by some artificial pressure, which, however, is not apt to last. London remains firm at £97. 10/ @ £98 spot, cash, for Straits Tin, with continued good deliveries. Singapore is unchanged. At Batavia, 13,000 piculs Billiton were sold on the 25th instant at 66.75 guilders per picul, the parity of which is £100 cost, freight and insurance, or 22½¢ landed here. It is believed that the above Tin was all bought for Europe. As the Straits and Java markets are considerably above parity of our own market, say, equal to 22½¢ here, it is, of course, very probable that shipments thence for October and November, or still longer, will remain on a very restricted scale, which in this manner would steadily reduce our visible supply. We quote at the close, large lines: Straits Tin, 21½¢; Australian, 21½¢; and Billiton, 21½¢.

"London, Oct. 8.—Although a large business continues to be transacted in this

metal, yet at the early part of the week there was scarcely so much animation in the market, and prices took a somewhat retrogressive turn, which was caused chiefly from the stiffening tendency of money, and not from any adverse feature in this market. But as no material reaction took place, operators found that holders were too firm in their quotations to submit to any material concessions, and toward the close have again come forward, and renewed life is being given to the market."

Tin Plates.—One of the leading metal statisticians here figures up from tables specially prepared, that during the past 7 years the import of Coke Tin Plates into the United States has been 50% of the entire amount, that of Ternes 24%, and that of Charcoal Bright 26%. Cokes are chiefly consumed for cans, Ternes for roofing, and Charcoal Bright for tinware. Our present import averages about 3,000,000 boxes of all sorts, of which Cokes at the above rate would therefore represent one-half, or 1,500,000 boxes. Of these 500,000 are used for oil, 750,000 for fruit preserving, and 250,000 for various other purposes of canning, &c. Now this gentleman estimates the falling off for fruit canning consequent upon the drought at 20%, which would constitute a lessened consumption of Cokes of 150,000 boxes. We have consulted another firm in the line and hear that so far as the trade of this latter house indicates, the demand for Coke thus far shows no such falling off. It is therefore a debatable question. Since Liverpool has advanced with Coke Tin to 16/6, buying for this country has ceased, but at 16/ there are plenty of purchasers, and we hear the market there is at present 16/.

We are very quiet here at the ensuing quotations: Charcoal Bright, \$5.7½ @ \$6.25; ditto Ternes, \$5.25 @ \$5.50; Coke Tin, \$5.20 @ \$5.37½; and ditto Ternes, \$5 @ \$5.12½, all large lines, ordinary brands, per box.

Lead.—Nothing in the way of sales that we hear of has transpired during the week. We consequently quote Common Domestic, nominally, 5¢. St. Louis is as quiet, and quotes 4¼¢ @ 4½¢. Large manufacturers here expect some Lead which is delayed, and meanwhile they do not want to pay higher prices for the little offered them. The stock is as light at St. Louis as it is here. Refined is also quiet and nominal. At St. Louis corroding Lead is worth 5¢, which is equal to about \$5.20 here. While Lead is thus in a state of transition, consumption of Common Domestic makes as satisfactory headway as could be wished, and the general situation is, therefore, by no means deficient in soundness; it only lacks elasticity on this side for the moment. We hear of no further change in Europe.

"London, October 8.—The Lead market is without change, prices being firmly maintained. There is, however, only a moderate business doing, the market evidently being supported by the limited supplies." We quote manufactures as follows: Sheet Lead, 8¢ per lb.; Lead Pipe, 7½¢; Tin-lined ditto, 15¢, and Block Tin ditto, 35¢, being an advance of ½¢ on the two first named; all less the usual discount.

Spelter and Zinc.—Some sales of Common Domestic Spelter have been effected at New York at 5¼¢. Stocks in the West continue light. Of Silesian there is no stock here; according to last reports received it would cost 5½¢ to import here. We quote Sheet Zinc, 7½¢. "London, Oct. 8.—Spelter steady at £16. 7/6 @ £16. 12/6 for ordinary brands."

Antimony.—Of Cookson's brand there is little here, and that little is all held by one party. In the meantime a fair jobbing trade is transacting. Hallett we hear quoted 13½¢ @ 13¾¢.

OLD METALS, PAPER STOCK, &c.

The purchasing prices offered by dealers are as follows:

Copper, heavy	10.15	10.16
Copper Bottoms	10.14	10.14
Yellow Metal	10.14	10.14
Brass, heavy	10.14	10.14
Brass, light	10.14	10.14
Composition, heavy	10.14	10.14
Lead, heavy	10.14	10.14
Tin Lead	10.14	10.14
Zinc	10.14	10.14
Pewter, No. 1	10.14	10.14
Pewter, No. 2	10.14	10.14
Wrought Iron	10.14	10.14
Light do.	10.14	10.14
Steel Plate	10.14	10.14
Machinery do.	10.14	10.14
Grate Bars	10.14	10.14

The prices current (prices paid by local dealers) for Rags, &c., are as follows:

Canvas, Linen	3.40	3.40
White Cotton	3.40	3.40
No. 1	3.40	3.40
No. 2	3.40	3.40
Soft Wood	3.40	3.40
Mixed Rags	3.40	3.40
Gunny Bagging	3.40	3.40
Jute Butts	3.40	3.40
Kentucky Bagging	3.40	3.40
Book Stock	3.40	3.40
Newspapers	3.40	3.40
Waste Paper and Scraps	3.40	3.40
Kentucky Bale Rope	3.40	3.40

FOREIGN TRADE MOVEMENTS.

The following is a summary of the foreign trade movements for the past week:

IMPORTS

For the week ended October 22:

1879. 1880. 1881.

Total. \$7,141,810 \$6,339,666 \$6,214,381

Prev. reported. 253,577,444 256,118,636 247,186,253

Since Jan. 1. \$60,719,283 \$59,458,181 \$57,800,585

Included in the imports for the week ended October 21, were articles valued as follows:

	Packages.	Value.
Anvils	253	\$2,522
Brass goods	60	28,950
Bronzes	28	10,554
Chains and anchors	80	8,807
Clocks	67	12,121
Copper	139	41,467
Cutlery	84	6,109
Engines	244	38,666
Hardware	31	2,334
Iron, pig, tons	5,833	115,127
Iron, sheet, tons	84	6,109
Railroad bars	468	4,678
Iron ore, tons	718	5,563
Iron, other, tons	1,585	6,738
Lead, pigs	1,181	3,598
Machinery	347	29,841
Metal goods	3	145
Nails	4	2,128
Needles	4	2,128

Wickel	27	1,706
Ohl metal	1	1,706
Platina	5	3,562
Platedware	5	3,562
Permutation caps	4	1,547
Buildery	15,774	15,774
Steel	19	77
Silverware	20,051	20,051
Tin, boxes	1,004,518	1,004,518
Tin, 11,378 bbls.	1,004,518	1,004,518
Wire	272	3,458
Zinc	94,488	4,772

The following are the imports of leading articles, compared with previous dates:

	For the week.	42 weeks of 1881.	Same time 1880.
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EXPORTS

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the two weeks ending Oct. 25, 1881:

Dutch West Indies.	Quan.	Val.
Nails, bxs., 100	100	\$127
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Dutch East Indies.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Hamburg.	Quan.	Val.
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Bremen.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Antwerp.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Rotterdam.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Copenhagen.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Liverpool.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

United States of Columbia.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Neuchâtel.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Exmouth.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

London.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Bristol.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Hull.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Travre.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

British Australia.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Glasgow.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Edinburgh.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Marshall's.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Cadiz.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Alcantara.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Santander.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Barcelona.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

British North American Colonies.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Marshall's.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Cadiz.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Alcantara.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Santander.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

Barcelona.	Quan.	Val.
Plum. gals., 100	100	\$257
Hdw., cs., 100	100	\$144
Clocks, bxs., 100	100	\$840

COAL.

Lack of transportation is the general complaint in the Coal trade—not that the volume of business is in any respect extraordinary for this season of the year, but orders from those who have been on short

allowance are plenty—many having held off to take advantage of a possible decline in prices—and cars are not available to meet demands with promptness. Both in the Anthracite and Bituminous trade some concern begins to be felt lest the requisite supplies fail to come to hand in time. We are assured, however, by one of our largest local agencies that there is no cause for alarm. It is not believed that the embarrassment now experienced will continue. "Probably by the middle of December, or say within six weeks," said our informant, "Coal will be in excess of demand." Prices of Anthracite are maintained, but there is no upward tendency. Quotations are unchanged. Wyoming Coals, \$3.90 @ \$4 for Lump and Grate; \$4.05 @ \$4.20 for Egg and Stove; Chestnut, \$3.90 @ \$4.10. Lehigh, \$4.40 @ \$5.25 for Lump; \$4.25 @ \$4.45 for Stove, Egg and Grate; Chestnut, \$4.

In Bituminous Coals there is corresponding activity, caused in part by the number of foreign steamers which have arrived in port almost simultaneously; but supplies would be sufficient for all demands if cars could be had. The shipments of Bituminous Coal are now made chiefly from Baltimore rather than Georgetown, on account of lack of water in the Chesapeake and Ohio Canal. Cumberland is quoted \$3.50 at Baltimore and \$4.75 at New York. Freighters are unchanged.

At a well-attended meeting of the Coal trade, held at No. 111 Broadway on Monday, the following committee, to draft a constitution and set of by-laws for a permanent association, was appointed: F. A. Potts, Richmond Talbot, R. S. Hill, F. Robinson and H. S. Ward. The objects of the association are to advance the interests of the trade and to protect it from abuses.

It is noticed that there is an increasing tendency to substitute steam boilers for water power, giving promise of a larger demand for Coal next year for industrial purposes than ever before. Even in such places as Lowell and Lawrence boilers are being introduced to supplement water. The total tonnage of Anthracite Coal from all the regions for the week ending October 15, as reported by the several carrying companies, amounted to 652,051 tons, against 699,018 tons in the corresponding week last year, a decrease of 46,934 tons. The quantity of Bituminous Coal sent to market for the week amounted to 99,376 tons, against 80,200 tons in corresponding week last year. The total tonnage of all kinds of Coal for the week is 751,460 tons, against 779,218 tons in corresponding week last year, a decrease of 27,758 tons, and the total tonnage for the Coal year is 25,761,152 tons, against 21,273,317 tons to same date last year, an increase of 4,487,835 tons.

PHILADELPHIA.

Office of The Iron Age, 220 South Fourth St., PHILADELPHIA, Oct. 25, 1881.

Pig Iron.—The market shows increasing strength, and although there has been no change in prices, transactions have been larger, and at inside figures furnacemen decline further orders. This applies to all descriptions, but is probably most marked in Mill Irons. A considerable number of 100-ton lots Gray Forge were picked up during the week at about \$20 at furnace, but it would be hard to find any to-day at less than \$20.50, while many quote \$21, firm. This is not due to immediate scarcity, but is intended, rather, to deter parties from forcing orders for future delivery. All the leading concerns have iron enough bought to see them to the close of 1881, but as large contracts for finished iron have been closed for spring delivery, manufacturers are anxious to secure raw material to cover. Furnacemen are trying to keep prices down, but when they see advances of from a tenth to a quarter of a cent per pound, and more obtained for all kinds of finished iron, they naturally wish to participate in the advance to some extent, especially when orders are thrust on them for delivery in the distant future. It is by no means certain that consumers would have to pay higher prices by deferring purchases until material was actually required, but having closed one side of the contract they want also to make the other side equally sure. Taking this view of the market, it is hard to see how prices can be kept down. Many very large concerns have engagements for all the work they can turn out within the next six months, and if they undertake to cover everything it will involve purchases which can scarcely fail to affect prices. Some of the furnaces have met the demand fearlessly, and have entered large amounts for 1882, but it is hardly likely that they will continue taking orders at old prices while their neighbors are getting a dollar or two per ton more for their iron. This in fact has already occurred, those who would quote \$20 at furnace have no iron for sale; others hold for \$21 to \$21.50. Foundry Irons are steady and firm, but have not been called for with much urgency, prices having been high, in proportion, for many months past. A few brands are quoted \$25, but anything favorably known is usually held at \$25.50 to \$26, and for one or two special favorites \$26.50 to \$27 is asked. As we have indicated, the immediate outlook favors something of an advance in prices, but much will depend upon the character of the advices from abroad. During the past day or two rumors of a slight reaction are afloat, and if there should be any pressure to effect sales in the United States markets, it will doubtless give a sudden check to any advancing tendency. At present prices there is not much to be feared from foreign competition, but at a dollar or two advance it would be quite another matter. The position is therefore too uncertain to warrant very confident predictions, but in the meantime everything appears to be safe, and prices perfectly satisfactory to all who are interested in domestic manufactures.

Foreign Iron.—Business has been very quiet and only a few small lots have changed hands, so far as we can learn. No. 3 Middleboro' is held nominally at about \$20.50, sales at \$20, although a lot of No. 1 was sold at \$20.25 less than a week ago. There is no regular market for this class of iron at present; consumers will only take it when prices are low, and as it cannot be replaced within \$2 per ton of what buyers offer, business is gradually dying out. Scotch iron is bringing better prices, but only retail lots

are taken at \$25 @ \$26, according to brand. Glengarnock sold at \$25, Gartsherrie and Coltness, \$25.50 @ \$26. Bessemer has been inquired for, but it has not resulted in much business. A 2000-ton lot, for early shipment, sold at a fraction over \$25, but buyers are very cautious and apparently not ready to take hold at rates recently quoted. There is more pressure to sell from the other side, and there is little doubt that liberal concessions from asking prices could be obtained if offers were made by cash buyers. At the moment the disposition among buyers is to wait for further developments; hence we quote the market nominal at \$25 @ \$25.50, according to date of shipment.

Blooms.—The market is steady and unchanged at last week's prices, say: Charcoal Blooms, \$72.50; Run-out Anthracite, \$60 @ \$62.50; \$52.50 for Scrap Blooms, and \$47.50 for Northern Ore Blooms.

Muck Bar.—Inquiries have been made for large lots, but for early delivery the mills appear to be sold up to December. Prices are nominally \$45 @ \$46, but we have not heard of any actual sales within the past week or ten days.

Shaped Iron.—The mills are more crowded than ever, and instead of gaining on their orders they are falling behind. The result is that a sharp advance in prices is asked on all lots which are to be delivered before January or February. Several of the leading mills are increasing their capacity, but will not be in a position to avail themselves of it before spring. Hence, orders can be placed at combination rates for spring delivery, say 3¢ for Angles, 3.7¢ for Beams, 3.9¢ for Channels and Tees. Earlier deliveries are quoted at 3.25¢ for Angles, 4¢ for Beams, and 4.25¢ for Channels and Tees. Bridge Plates, 3.5¢; Hammered Axles, 3.75¢; Rolled Axles, 3.4¢.

Bar Iron.—Business continues active, and prices are again a shade higher. Store price has been advanced to 2¢, and a good deal of business has been entered at that figure when prompt delivery can be guaranteed, although 2.7¢ is the mill price. The scarcity still continues, although not quite so marked as it was some time ago. Mention was made last week of sales made by a Pittsburgh firm which, we understand, amount to about 700 tons in all. This for the time being was quite a relief to the market, but there is no reason to think that the purchases could be duplicated. The city and near-by mills are generally about as full of orders as they care to be, and unless for small lots it is difficult to get anything taken for delivery before December or January. Prices range from 2.7¢ @ 2.9¢ market firm. Skelp Iron is quoted 3.0¢ @ 3.1¢, and difficult to get in quantity. Negotiations are in progress to import several lots, and it is not improbable that something will be done in that way.

Plate and Tank Iron.—There is very little to be said under this heading, as nearly all the mills are working on old contracts. There are plenty of orders waiting acceptance, but parties are unwilling to buy largely at the high rates quoted, so that business is something of a retail character. Prospects are entirely satisfactory to manufacturers, however, and prices are firm as last quoted, viz.: Tank Iron, 3.50¢; Reformed, 4¢; Shell, 4.25¢; Flange, 5¢ @ 5.50¢; and Fire-box, 6¢ @ 6.50¢.

Wrought Iron Pipe.—There is a heavy demand for all descriptions, and prices are firm at 40¢ discount on Boiler Tubes, and 55¢ @ 57½¢ on Gas and Steam Pipe.

Sheet Iron.—There is no change to report, neither is there likely to be for some time to come. Manufacturers are crowded with orders which will fully employ them during the balance of the year, so that concessions in price are entirely out of the question. We quote same as last week:

Common Sheet, No. 27 and 28.....	56¢
Common Sheet, No. 29.....	57¢
Common Sheet, No. 30.....	58¢
Common Sheet, No. 31.....	59¢
Common Sheet, No. 32.....	60¢
Best Refined 1/4 @ 1/2 advance on the above.....	7¢
Best Bloom Sheet, No. 27 to 29.....	65¢
Best Bloom Sheet, No. 30 to 32.....	66¢
Common Red Plates, 3/16 to 1/2.....	3.5¢
Blue Annealed, 1/16 to 1/2.....	3.8¢ @ 4¢
Best Bloom Galvanized, discount.....	30-50
Second quality, discount.....	40-50

Steel Rails.—There is more inquiry and more disposition to place orders as early as possible. Sales during the week amount to about 8000 tons for 1881 delivery, at prices ranging from \$61 to \$63 at mill, a 4000-ton lot of 60's having been taken at the lower figure; smaller lots at \$62 @ \$63. For the first half of 1882 it is difficult to get an order in at all, and to the largest buyers \$60 is said to be an inside figure. Foreign advices are also favorable to sellers, and deliveries before April or May hard to obtain. There are several offers out for 35's for shipment to Gulf ports, but it will be difficult to get them as early as desired. Prices may be quoted \$61 @ \$63 for foreign Rails, and about \$1 less at mill for American, according to date of delivery. Market firm.

Steel Blooms.—Business is rather quiet in this department, partly because many of the mills are fairly supplied, and partly because of the upward tendency of prices. At rates recently paid there is very little margin for rolling, and if Rails do not advance, Blooms must decline, or that branch of business be given up. We hear of \$46, duty paid, being asked to-day for prompt shipments, while sales have been made at very near that figure. Freighters are a little against shippers, and manufacturers are sold so close up that they cannot quote for earlier than January; hence, business for the time being is very much restricted.

Iron Rails.—There has not been as much business closed as was expected, which is due partly to the extreme firmness manifested by sellers. Lots of a few hundred tons each have been taken at \$47.50 at mill for 56's, and this appears to be a bottom figure, with \$48 asked. Heavier contracts are expected soon, and prices are likely to be fully maintained. Light Rails are quoted \$50 @ \$52, according to weight. Foreign, \$45.50 @ \$46 for 56's, and about \$47.50 for 55's.

Railway Fastenings.—The demand is large and supplies very inadequate; spot lots of Spikes commanding 10¢ @ 15¢ per keg premium. General quotations are as follows: Spikes, 3.10¢ @ 3.15¢; Fish Plates, 2.6¢; Bolts and Nuts, 3.25¢ @ 4¢.

Old Rails.—The market continues firm, and buyers would find the market 25¢ @ 50¢ against them as compared with last week. Business is very limited, however, and it is exceedingly difficult to find buyers for large lots at prices asked. For shipment, \$28.50 is asked for Tees, and about \$31 for Doubles. Lots from store may be quoted \$28 and \$31 respectively, a 200-ton lot of Doubles having been taken at \$31 in store, and for shipment \$31.50 bid.

Crop Ends.—Are offered at \$26 for shipment, a 500-ton lot about having been taken at a higher price, said to be \$26.50 ex ship. Old Steel Rails nominal at \$26 @ \$27.

Old Car Wheels.—Are held at \$30 for best makes; buyers offer about \$1 less money. Old Axles nominal at \$37 @ \$38.

Scrap Iron.—Is steady and scarce at \$29 @ \$30 for Medium, and \$31 @ \$32 for choice Wrought, and about \$20 for Cast.

Nails.—Unchanged, stocks light and prices firm at \$3.40, less the usual trade discount.

PITTSBURGH.

Office of The Iron Age, 77 Fourth Avenue, Pittsburgh, Pa., Oct. 25, 1881.

Pig Iron.—We have to report a continued strong and fairly active market, and while there has been no change in prices as compared with the date of our last report, the feeling on the part of furnacemen is one of continued confidence, and all good qualities offered meet with ready sale at full prices. While it is well known that mill owners generally have been buying pretty freely for some time past, and have fair stocks in yard and to arrive, yet they are nearly all willing to buy any good lots that are offered at ruling prices, from which it is evident that they do not expect a reaction, but that, on the other hand, they are apprehensive of still higher prices. The railroad blockade is affecting the furnacemen as well as the mill owners; it is difficult to obtain supplies of ore, coke, &c., and some furnaces, it is stated, unless the blockade is raised, will soon be obliged to blow out for want of supplies of coke. Neutral Mill Irons from native ores may now be quoted at \$23.50, 4 mos.; last sales were at this figure, but some of the furnaces are now asking \$24; ditto from Lake ores, \$24 @ \$24.50, the latter for that inclined to Red-short Foundry grades; \$24, 4 mos., for No. 2, and \$25 for No. 1.

Bessemer Iron.—No sales reported the past week, but the market is firm, with considerable inquiry and but little offering. No. 1 is still quoted at \$28 @ \$29. Some dealers predict that No. 1 will go to \$30 before the close of the year.

Muck Bar.—Continues in scant supply, and with no apparent abatement in the demand and but little offering. Prices are still tending upward. Sales are reported at \$43 @ \$44, cash—an advance of fully \$1 per ton. Since the advent of cooler weather the production has been largely increased, but so has the consumption, as the mills generally are using all they can make.

Manufactured Iron.—While possibly the demand is not as urgent as it was a few weeks ago, it is owing mainly to the fact that buyers generally have realized that it is almost impossible to have an order of any magnitude placed for near-by delivery, as our mills are, almost without exception, sold up until the close of the year. There are plenty of buyers for immediate delivery and but few sellers. Manufacturers are loth to turn away orders, but, as a rule, they are refusing to bind themselves in regard to time delivery. In a word, the best they are willing to do is to book orders and to do the best they can in regard to delivery, with the distinct understanding that they are to have market rates, whatever they may be, whenever the goods are shipped. We repeat former quotations, full card: Merchant Bars, 2.50¢; Sheet, 4.30¢ for No. 24; Tank, 3.30¢; Hoop Iron, 3¢ @ 3.20¢; Skelp Iron, for which it is almost impossible to place an order at any price, is quoted at 3¢.

Nails.—The activity noted for some time past continues; usually the rush subsides the latter part of this month, but if the weather is at all favorable there will be a heavy consumption during the balance of the year or all winter, for that matter. Prices remain unchanged on a basis of \$3.25 for 10d, with usual abatement and discount.

Wrought Iron Pipe.—There appears to be no abatement in the demand, and one of the largest mills in the country is virtually out of the market for the remainder of the year. Discounts have been reduced to 55¢ @ 57½¢ on Gas and Steam, which of course is an advance. Boiler Tubes remain unchanged at 40¢ off. Oil Well Casing has been advanced to 85¢ per foot, net, and do. Tubing to 25¢. There appears to be considerable activity in Oil Well supplies; a good many new wells are being put down, notwithstanding the unremunerative price of the article.

Rails, &c.—Steel Rails are still quoted at \$62.50 @ \$63, cash, as well for November as December delivery, and \$60 and upward for 1882. Railway Spikes are firm, but unchanged at 3¢, 30 days; Splice Bars higher, 2.60¢ @ 2.65¢, as are also Track Bolts, 3.75¢ @ 4¢. Mills making a specialty of these articles are assured of an active trade all winter.

Steel.—Manufacturers continue to report business as being quite active. The mills are all employed, and prices are firm, but unchanged. It is worthy of mention that, notwithstanding the material advance in finished iron, there has been very little change in the prices of Steel this year. We quote: Best brands of Refined Cast Steel, 11¢; Crucible Machinery, 6½¢; Bessemer and Open-hearth Machinery, 5¢; ditto Spring, 4¢ @ 4½¢; ditto Plow, 4½¢ @ 4½¢.

Scrap.—Wrought Scrap is still quoted at \$28 @ \$29 per net ton for ordinary, and \$30 @ \$31 for selected Railroad. Cast Borings sold during the week at \$16 per gross ton. Wrought Turnings, \$21 @ \$22 per net t.n. Crop Ends are still quoted at \$29 @ \$30, gross, and Old Car Wheels, in the absence of sales, may be quoted at \$28 @ \$30, gross per net ton.

Coke.—Owing to the railway blockade, business is very much restricted, as it is almost impossible to obtain cars, and while

this state of affairs continues no improvement need be looked for. There is no abatement in the demand; indeed, it is more urgent than ever, and it is stated that some Pig Iron furnaces will soon be obliged to blow out for want of coke. For the time being the railroads, it is understood, are refusing to receive any except for local points, and this important interest is in a most unsatisfactory condition. There would be a demand for all that could be produced if only transportation could be obtained, but as it now is producers will either have to pile up or curtail their production, simply because they cannot get cars. A resumption of river navigation would be of great advantage to this interest. We continue to quote at \$1.60 per ton, free on cars at ovens, and \$1.15 @ \$1.75 for small lots.

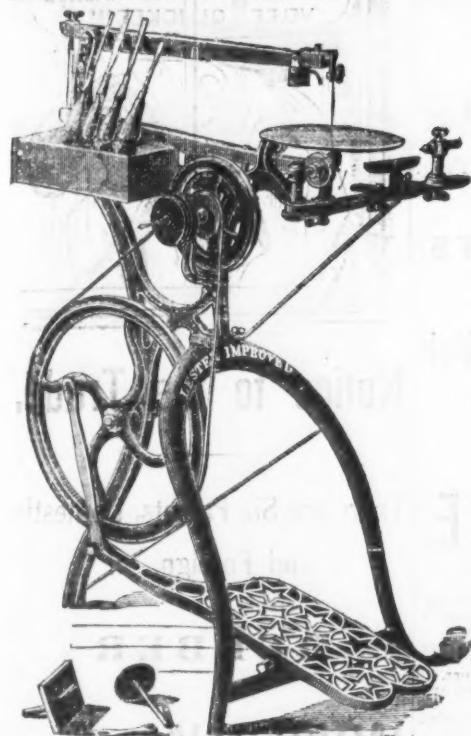
Window Glass.—Manufacturers generally report business as being quite active, some of them are sold up for the rest of the year, and prices are steady; so far as we can learn the regular rates established by the Western Association are being adhered to. Discounts on carload lots, 60 and 10 and 5 % on single, and 70 % on double strength, 60 days, 2 % off for cash.

CHICAGO.

Office of The Iron Age, 36 and 38 Clark Street, Chicago, Oct. 24, 1881.

Pig Iron.—The situation of Pig Iron in this market remains unchanged since our last writing. The demand is good and the market very firm. We learn of a sale of 500 tons Calumet having been made during the week at \$27 @ \$28, an advance of 50¢ over our last quotations. Crane Iron is in active demand at \$29 for No. 1 and \$28 for No. 2. Thomas is quoted nominally at \$28.50 @ \$30; Scotch Imported, very firm at \$29 @ \$30; American Scotch, \$25.50 @ \$28.50; Silvery Soft, \$24 @ \$26. Quotations on Lake Superior Charcoal Irons are as follows:

BRACKET SAWS



are now a staple article in all Hardware Stores. They make trade lively about Christmas time, when it would otherwise be dull. The demand is such that any dealer can sell a few if he has them in stock. During the past six years a great number of saws have been put on the market, of more or less merit, but at present the demand is almost wholly for the Lester and Rogers Saws. The Lester Saw with all of its attachments sells for \$10.00, and the Rogers Saw for \$3.50. These rates seem low, but we are able to sell at such prices Saws which give entire satisfaction, with no come-back on the Dealer.

We are also Headquarters for Saw Blades, Wood, Designs, and all things pertaining to the Bracket Sawing business.

A fair discount to the trade.

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EXCELSIOR MILLS. Genuine Turkish Emery.
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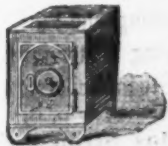
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PLYMOUTH MILL CO.'S Black and Tinned Iron Rivets.
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Also a large line of Heavy and Shelf Hardware.



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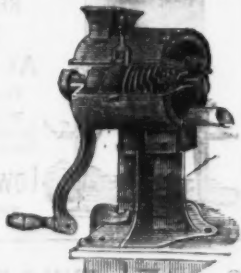


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Pork an hour.

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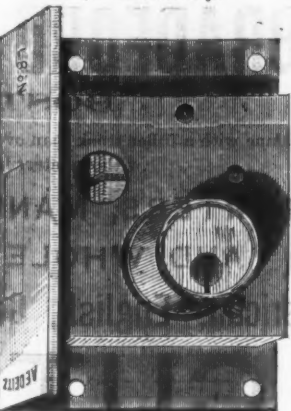
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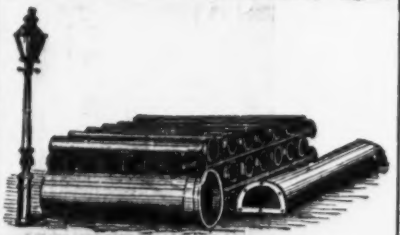
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straight bars, full width and enlarged jaw, hav-
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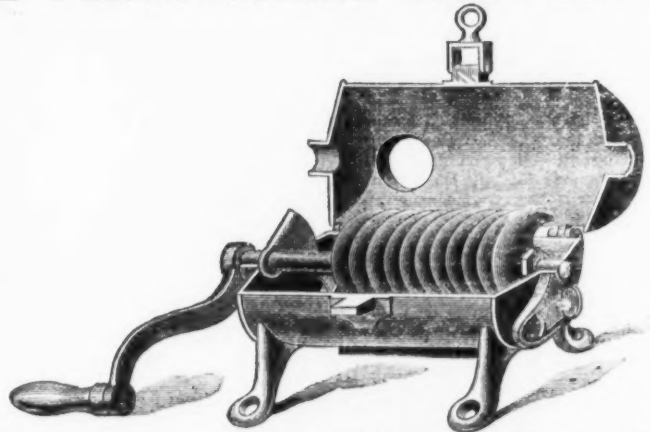
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No. 1, containing 8 Steel Knives per dozen, \$24.00
No. 2, containing 12 Steel Knives " 36.00
No. 3, containing 12 Steel Knives " 36.00
Nos. 1 and 2 are packed 1/2 dozen in a box; No. 3 packed 1/4 dozen in box. Orders solicited.
Discount to the trade 50 per cent.

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SCIENTIFIC AND TECHNICAL.

Mr. E. R. Dale, of Queen Victoria street, London, recently exhibited

A NEW MOTOR,

the principle of its action being as follows: Water is placed in one vessel, and when heated enters another one, and vice versa. These motors may be made in a variety of forms, and, when required, rotary motion may be produced by various means. The want of a suitable motor for blowing country church organs is much needed, and if found practicable, this invention may prove of use in this direction.

It is reported that Mr. L. W. Hamilton, of Lawrence, Kan., has invented a process for producing what he calls

"LUMBER" FROM STRAW,

by a process which is kept secret. It can be made to any required length and up to 32 inches wide, will hold nails as well as wood, is water-proof, and takes a high polish. It is about the color of oak, with a specific gravity of one-fifth more than that of well-seasoned oak.

At the Frankfurt Patent and Trade-mark Exhibition there is shown a most ingenious apparatus for

THE CONSUMPTION OF FIRE-DAMP

by chemical means, which deserves the attention of mining engineers. Hitherto only physical means have been adopted, but the principle of the Korner apparatus consists in using the decomposing properties of platinum metals in annihilating fire-damp. The inventor is Mr. Guido Korner, of Freiberg, Saxony, and the maker is Mr. L. Froben, of Berlin. The invention is described as "an apparatus for consuming fire-damp," and consists of a so-called "ligroin lamp," over the burners of which asbestos caps, coated with platinum and palladium, are fixed. These caps are heated up to a red heat, and the apparatus is brought into the mine and hung up in places where fire-damp exists. The caps are never heated up to a white heat, thus avoiding any danger of the fire-damp being ignited by them, even if the gas should suddenly appear in large quantities. The apparatus may, therefore, be safely used wherever fire-damp or an explosive mixture of gases accumulates. It operates quietly, without detonation, the fire-damp being consumed on the surface of the glowing caps, without heating them to any extent, and annihilates the considerable quantity of 35 to 53 cubic feet of explosive gas per minute, or 53,000 to 70,000 cubic feet in 24 hours. The basin containing the oil is filled every 24 hours, the apparatus requiring no further attention during that time. Extensive experiments are to be carried on with the apparatus in the mines of Hermsdorf, Germany, and it is to be hoped that the trials will be accompanied by favorable results, and thus confer a boon upon our colliers in affording them greater protection in their laborious calling, carried on at considerable and constant peril to life and limb.

After a two-years' trial of Siemens' system of electric lighting in the City of Berlin, Messrs. Inman & Co. decided to apply it to the

LIGHTING OF THE STEAMSHIP CITY OF ROME on a greatly extended scale. The saloon is illuminated by 100 Swan incandescent lamps, while 150 others are distributed among the drawing rooms, smoke rooms, captain's cabins, officers' cabins, state rooms, &c. The engine rooms have six Siemens alternate current arc lamps of 500 candle power each, while 10 such lamps are placed in the upper and lower stowage. It was the opinion of the late Mr. Inman that the electric light was of more advantage in the emigrant quarter than in any other part of the ship. The fittings of the Swan light have been specially designed to harmonize with the decorations of the saloon, and every lamp can be turned on and off with as much ease as a gas jet. The two electric machines, which are duplicates, are to be driven by a three-cylinder compressed engine.

The well-known paper mill at Annouay, in the Department Ardèche, France, is now producing

PAPER MADE FROM BUFFALO SKIN, the product being perfectly transparent, although it is impenetrable. This "animal

paper is now preferred in many instances to parchment.

No pains are spared to make the modern war ship invulnerable. A series of

EXPERIMENTS WITH DECK ARMOR,

which recently commenced at Eastney, near Portsmouth, England, besides promising to be of a very interesting character, are of great importance. Up to the present time very little trustworthy information was available on the subject of the resistance of deck armor when struck obliquely by a projectile, although for years past the Admiralty have been building ships which depend for safety to no inconsiderable extent on that protection. Deck armor varies from 1 inch to 3 inches in thickness, and is usually worked in layers of 1 inch in thickness. The first layer is bolted to the deck beams, and the other layers are riveted to the first. Most of the more recent ships are designed with armor decks at their extremities at or near the water line, while in some others there are armor decks below the water line forward and aft, and an armor deck just above the water line along the midship part. The object of this armor is to afford protection against light shell and the fire from machine guns. It is hardly expected that it will suffice to keep out heavy projectiles when the angle at which it is struck is large; but when it is small it will doubtless be of some service, especially in breaking up shell. In all previous experiments with deck armor the plates have only been subjected to the fire from machine guns, the results proving that for oblique fire 1½ inch of steel will sufficiently protect a deck against the heaviest machine gun. The first experiments which have now been made for the purpose of ascertaining what resistance the decks of ships will offer to the fire from heavy guns, although not altogether satisfactory, throw considerable light on the subject. Seven targets were fired at, one consisting of ordinary iron and two of Sir Joseph Whitworth's compressed armor; the fourth was a steel-faced plate manufactured by Messrs. Cammell & Co., while the three others were steel plates manufactured respectively by the London Steel Company, the Bolton Steel Company and Sir John Brown & Co. Each target was bolted to beams similar to the deck beams of a ship, and was set at an inclination, so that the projectiles from the attacking guns struck it at an angle of 15 degrees. The guns used were an 18-ton 10-inch gun, which was fired with a battering charge of 70 pounds; the weight of the projectile being 400 pounds; and a 12-ton 9-inch gun, which was fired with a battering charge of 50 pounds, the weight of the projectile being 250 pounds. The range was in each case 100 yards. It had been intended to commence upon a trial target of iron, and, passing upward from a very slow velocity, to have ascertained that velocity of projectile which would just penetrate the target, and then to have tested each of the other targets with this velocity, so as to obtain a comparison between the merits of the various systems represented. This programme was not, however, followed. A full charge was fired from all the guns at every plate, and the result was that each target was crushed in and broken so completely that the desired comparison could not well be made. The targets did good duty, however; in only one instance did a shot get through; in all others the shots were deflected from their course, and in most cases they were broken upon impact. There is no doubt that the treatment these targets were subjected to was very severe, but not more severe than that to which the decks of our ships will be liable in action; 15 degrees is not a considerable inclination for the slope of the deck combined with the line of the shot, although it is not probable that many shots could strike a horizontal deck at so great an angle in an action in fair weather. It would have been interesting to have seen the effect upon the targets had live shell been fired against them instead of solid shot, and we trust this will be ascertained upon a future occasion.

At the St. Louis Fair the first premium and medal for the best steam pump for low service or general use was awarded to the New Pulsonometer Steam Pump Company, New York.

TACK PLATE,

NAIL ROD, RIVET ROD, and Other Special Rolling.

To meet the demands of our own business for a superior quality of work, we have erected a new and improved Rod and Tack Plate Mill, especially designed for the finest and most accurate work.

As our own requirements do not utilize our entire capacity, we are prepared to receive and promptly execute orders for rolling a liberal quantity of this class of work. Our location in Boston affords the most favorable facilities to Importers of Swedish and other iron, for having the material rolled into its

Special Prices and terms given on application.

Contracts for rolling over a period of several years made if desired.

GLOBE NAIL CO.,

Howard Street, Boston Highlands, Mass.

NOTICE.

TO THE HARDWARE TRADE,

Retail and Wholesale.

Before buying, send to me for quotations. Will give special figures lower than market rates on a large line of Shelf Hardware and Tinware.

A. W. WHEELER,
141 Lake St., Chicago.

R. COOK & SONS,
Manufacturers of

Carriage & Wagon AXLES,

WINSTED, CONN.

ESTABLISHED 1839.

WANTED—10,000 MECHANICS,

To send Five cents each for sample of the Metal Workers' Crayon & Mechanics' Companion. The handiest and cheapest marker for any kind of surface. Makes a white mark. Convenient and nice to work with or to carry in the pocket. Sent postpaid on receipt of 5 cents.

D. M. STEWARD, Sole Manufacturer,
231 State Avenue, Cincinnati, Ohio.

DAVID ROUND
HAND-MADE COIL
CABLE & BLOCK
CHAINS.
CLEVELAND, O.
SEND FOR PRICES.

BLACKSMITHS' FORGES

Portable or stationary, superior to stone or brick. Can be used with bellows or fan. Send for information to the

FORGE COMPANY,
Brooklyn, E. D., N. Y.

S. B.
1800.

M. L. B.
1845.

M. L. B. & CO.
1856.

B. & A.
1867.

B. & A.
1881.

BRADFORD & ANTHONY,

BOSTON, Mass.

Continue with a fuller stock than ever before the business which has been conducted without interruption for eighty-one years, as

IMPORTERS, MANUFACTURERS' AGENTS,
AND WHOLESALE DEALERS IN

American, English, German, French and Swedish

CUTLERY, SKATES AND FISHING TACKLE.

Sole selling agents for the United States for **ENGSTROM'S SWEDISH RAZORS.**
Sole selling agents for the United States for Starr Man'g Co.'s **ACHIE SKATES.**
Sole selling agents for **WINSLOW'S POPULAR SKATES,** Wood Tops, Clubs, All Clamps, and Ladies' Skates, Popular Roller Skates, Park Roller, Improved Circular Running Vineyard Rollers.
Sole selling agents for **ROBERT MURPHY'S** Corkscrews, Oyster Knives, Shoe Knives, Rubber Knives, Butter and Cheese Tryers and Steel Implements.
Sole selling agents for **D. ROBERTS'** Nickel-plated and Japanned Handle Shears and Scissors.
Sole selling agents for New England, for **H. REINISCH'S SONS'** American Shears, Scissors and Trimmers.
Sole selling agents for New England, for the **STAR SCISSORS COMPANY'S** Nickel-plated Ladies' Scissors, Trimmers, &c.
JOHN RUSSELL CUTLERY CO.'S Table Cutlery, Pocket Knives, Butchers', Painters', Druggists' and Household Cutlery, Silver-plated Forks and Spoons.
JOSEPH RODGERS SON'S Table Cutlery, Pocket Knives, Scissors, Razors, Erasers.
GEORGE WOSTENHOLM & SON'S Celebrated IXL Pocket Knives, Razors, Farriers' Knives.
JONATHAN CHOOKES' Pocket Knives.
WADE & BUTCHER'S Celebrated Razors.
FREDERICK REYNOLDS' Razors.
THOMAS R. CADMAN'S BENGALL Razors and Razor Blanks.
NEEDHAM BROTHERS' "Repeat" Pocket Knives.
JOHN RUSSELL CUTLERY CO.'S Nickel-plated and Japanned Handle Shears and Scissors.
Sole selling agents for **BARBER'S RAZOR STRAPS.**
Sole selling agents for **UNITED STATES FISH HOOK WORKS.**
Sole selling agents for the **FISHING LINES** bearing the Trade Mark, "Best Quality Hand Laid Linen and Silk Lines," which received Centennial Medal for "strength and care taken in manufacture."
Sole selling agents for the **Patent Adjustable Floats and Sinkers.**
Importers of Calcutta and Japan Bamboo Poles, Fish Hooks, Swivels, Silver Fishing Gimp, Spanish Silk Worm Gut.
Selling agents for the **Best Manufacturers of Jointed Fishing Rods, Braided Fishing Lines, Fishing Reels, Artificial Baits, Patent Pocket Flasks, Hammocks.**

COMPRISED IN ABOVE ARE

More than 1130 Different Patterns of **POCKET KNIVES.**

More than 500 Styles and Sizes of **SCISSORS AND SHEARS,**

More than 150 Patterns of **RAZORS.**

More than 750 Kinds of **TABLE CUTLERY.**

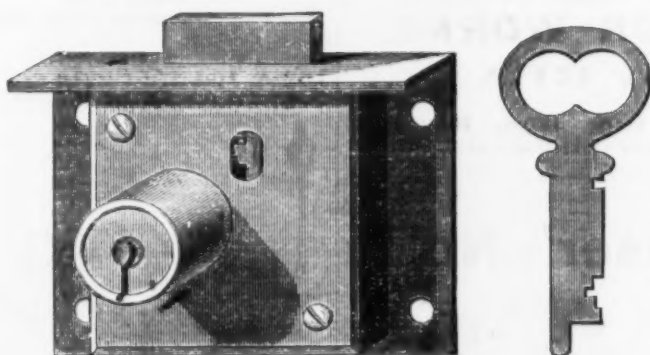
And all other articles of **CUTLERY** in great multitude.

Lists of Murphy's Steel Goods, catalogues of our Skates, catalogues of our Fishing Tackle Stock will be mailed on application to dealers in these lines of goods.

See Copartnership Notice on Page 20.

BRADFORD & ANTHONY, Boston, Mass.

TWO NEW LOCKS.



THE EAGLE LOCK CO.,

TERRYVILLE, CONN.,

Have just added two new and valuable patent locks to their already large variety, which will at once commend themselves to the trade.

No. 6101 (Brass) and 6117 (Iron), represented by the above cut, may be locked without using the key, by simply pressing on the plate in the end of the tube. The other patent, Nos. 6201 and 6217, is a lock similar in appearance, but is so constructed that with a small screw driver any dealer can adjust the lock to an endless variety of keys, or make his whole stock "alike" to fit one key, without opening the lock or affecting its security.

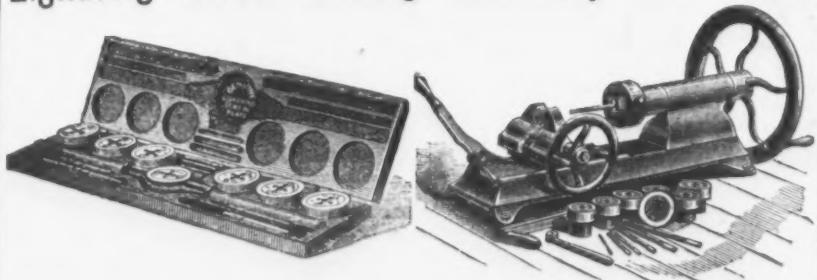
These patents have been applied only to drawer and cupboard locks as yet, but will soon be produced in chest and wardrobe locks.

For Sale by Hardware Jobbers Throughout the Country.

WILEY & RUSSELL MFG. CO.,

Greenfield, Mass.,

Lightning Screw Cutting Machinery and Tools.



Lightning Screw Plates. Sets of Taps and Dies from small wire sizes up.

"O" Plate cuts to ½ inch.

"A" and "A1" cuts to 7-16 inch.

"B" cuts to ¾ inch.

"C"

"D" cuts to 1½ inch.

"O" Bolt Cutter, hand or power. A pulley may be substituted for balance wheel for power if required. Cuts to ½ inch.

Drills, Upsetters and Benders.

Whitworth, Philadelphia or V Threads, as required.



Notice to the Trade.

There are Six Patents, Domestic and Foreign, on

RUBBER

WINDOW

CLEANERS.

We own them all, and shall suppress infringers.

The genuine Cleaner is plainly stamped, "MANUFACTURED BY PERFECTION WINDOW CLEANER CO., INCORPORATED JULY 26, 1878."

Has Patent Hollow Handle with P. W. C. Co., cast in face.

Our manufacturing facilities are so large that we undersell cheap and worthless infringers.

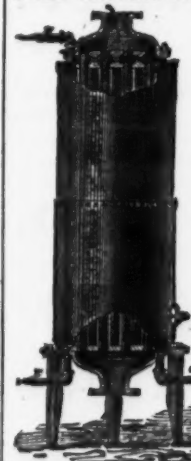
We gladly mail sample cleaner with price lists to wholesale trade. Address

PERFECTION

WINDOW CLEANER CO.,

167 Madison St., Chicago, Ill.

THE LOWE PATENT FEED WATER HEATER & PURIFIER.



FOR
Heating and Purifying Water for Steam Boilers.
Patented July 13, 1877.
Has Straight Tubes.

SIMPLICITY,
RELIABILITY and
EFFICIENCY
At Less Cost
Than any Other.

Write for prices and further information to the manufacturers,

Lowe & Watson,
BRIDGEPORT, CONN.

Grant Fan Mill & Cradle Co.

Manufacturers of

Grant's Grain, Coffee, Rice, Cochineal and Pimento Fans,

and
TUBERY WING GRAIN CRADLES,
4, 5 and 6 fingers.
GRAPE VINE CRADLES,
4 fingers.

SOUTHERN PATTERN GRAIN CRADLES,
4, 5 and 6 fingers.
All of a superior quality. None genuine unless marked Grant Fan Mill and Cradle Co. Send for illustrated catalogue and price list.

P. O. Address,
MELROSE Remondet Co. N. Y.

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MANUFACTURING CO.,
821 Cherry St., Philadelphia, Pa.



TELESCOPE TUBES.

Fine Mandrel-drawn Tubes, from Brass or German Silver. Tubes for sliding one within the other made to order. Manufactured by ROBT. T. DEAR & CO., 500 N. 15th St., Philadelphia, makers of the American Improved Brass Garden Syringe.

101 and 103 Duane Street, New York.

Frostings.....	100
Glue, White.....	25

Frostings.....	40c
Glue, White.....	24 @ 35c
Sheet.....	20c
Glaaiers' Points, Zinc.....	8c
Gum, Copal.....	30c
" Damar.....	25c
" Shellac, English.....	45c
" " dark.....	40c
Litharge, English.....	15c

Pumic Stone, selected Lumps.....	4 @	24c
" powdered.....	4 @	24c
Pine Tar, bbls.....	1 @	83.40
Pitch.....	1 @	12.50
Putty, in bladders.....	1 @	3 c
" in bulk.....	1 @	24c
Rosin—Common and Good—Strained.....	1 @	23.25
E & F.....	2.25 @	2.65
G & H.....	2.70 @	2.85

I & K	13.10 @	3.30
M & N	13.80 @	4.10
Apirita Turpentine	54 @	56c
Whiting Spanish		54c
Waste, No. 1 Cop.		100
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No. 2		06c

66	No. 1 Colored.....	70
66	No. 2 ".....	61
66	Washed Machine.....	9c

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FRENCH WINDOW GLASS.
Prices current per box of 50 feet.

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 14.....	\$ 6.50	\$ 5.75	\$ 5.50	\$ 5.25
10 x 12 to 16 x 24.....	7.25	5.75	5.25	5.00

18	12	10	40	7.25	8.75	6.25
18	12	20	30	9.25	8.50	7.75
18	16	20	24	10.25	9.25	8.25
18	20	24	30	11.00	10.00	9.00
20	16	20	44	11.75	10.75	9.50
20	16	30	50	13.25	12.50	10.50
20	16	30	54	14.00	13.00	11.25

30 x 50 to 34 x 50	15.00	13.75	12.50
34 x 50 to 34 x 60	15.50	15.00	13.25
30 x 60 to 40 x 60	17.50	16.00	15.00

Double Thick.—Discount 50 & 10.

SIZES.	1st.	2d.	3d.	4th.
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1	X	8	10	10	15	8.25	7.75	7.50	7.00
1	X	11	10	15	24	10.00	9.25	8.75	8.25
1	X	22	20	30	30	12.75	11.75	10.75	
5	X	30	10	24	30	14.25	13.00	11.75	
5	X	28	10	24	30	15.25	13.75	12.50	
6	X	30	10	30	44	16.25	14.75	13.00	
6	X	40	10	30	60	17.50	16.75	14.25	

2 X 42 to 30 X 54	18.50	17.25	14.75
2 X 56 to 34 X 56	19.50	18.25	16.25
4 X 58 to 34 X 60	20.50	19.50	18.00
6 X 60 to 40 X 60	23.00	21.00	20.00

An additional 10 per cent. will be charged for all glass more than 40 inches wide. Any size over 6

Toledo Spring and Variety Works

**The Celebrated American Suspending
Eave Trough Hanger.**

THE BEST IN THE WORLD
MANUFACTURED BY
HEARTLEY & DEMPSEY,
297 St. Clair Street, Toledo, Ohio.
Send for prices.

N. B.—Also manufacturer of Children's Carriage Springs, Attachments, Wagon Seat Springs and Seat Scaes, Mill Picks and Stone Cutters' Tools, &c. Pulleys for hoisting Eave Trough, and Tools for bending Danger Rods.

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BELTING,

HOSE, PACKING,
lace leather. Wringer Rolls.

Grain Drill Tubes, &c.

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**INTERCHANGEABLE
LOCK-CORNER SHELF BOXES,
Screw Cases, &c.,
FOR THE HARDWARE TRADE**

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ESTABLISHED 1835

EDWARD & TOOLS

BEMIS & CALL
ALL GOODS STAMPED BEMIS & CALL CO.
MADE IN MASS.
NONE OTHERS GENUINE.

I. V. CARTER,
290 Pearl Street, New York.
Manufacturer of

SHOULDERS' TOOLS

Also a full line of *Plasterers' Tools*.
 the largest assortment in the United States.

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EDWARD MILLER & CO.,

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Sheet Brass, Cast Brass, Brass Kettles, Machine Oilers, Lanterns,

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Sole Manufacturers of

Patent Hot Polished Shafting.

Medal of Superiority awarded at American Institute Fair of 1880.

This Shafting is superior to any in the market, and commends itself to the trade for the following reasons, viz:

- 1st. It is perfectly straight and round.
- 2d. It can be finished accurately to any desired gauge.
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- 5th. Its surface is composed of magnetic oxide of iron, and consequently presents a journal or bearing surface that is unexcelled.
- 6th. The peculiarity of its manufacture is such as to entail loss in making it, if other than superior stock is used. Those purchasing it may therefore be assured of receiving first-class material.

Price lists, catalogues and references furnished on application.
Where parties desire it we cut keyways or splines any length required, at a moderate charge.

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DOOR LOCKS AND HARDWARE,

BRONZED IRON AND BRONZE METAL DOOR TRIMMINGS, BUTTS AND HARDWARE.

CAST BUTTS, DOOR BOLTS, WELL WHEELS, FLUSH BOLTS, SHUTTER BOLTS, PAD LOCKS, BARN DOOR HANGERS, & RAIL, CRINDSTONE FIXTURES, SCREW & SIDE PULLEYS, NOISELESS PULLEYS, HAY FORK PULLEYS, SHELF BRACKETS,

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Having largely increased our facilities and line of goods, we invite the attention of the Trade.

Illustrated Catalogues Furnished on Application.

Agencies. { James M. Vance & Co., No. 211 Market St., Philadelphia.
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THE STANLEY WORKS,

MANUFACTURERS OF

Wrought Iron Butts, Hinges

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DOOR BOLTS,

Plain, Japanned, Bronzed and Plated.

FACTORIES:

WAREHOUSE:

New Britain, Connecticut. 79 Chambers St., New York.

Wilson Bohannon,

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BRASS PAD LOCKS

For Railroad Switches, Freight Cars, and the Hardware Trade. All sizes, with Brass and Steel Keys, with and without chains.

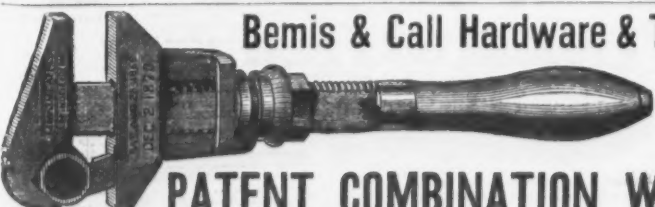
Patent Horizontal Rim Cylinder Night Latch.

Self-adjusting to doors of any thickness, with Patent Stop and Drawer Back Knob.

PASSENGER CAR LOCKS, Bronzed, Nickel-Plated and Japanned.

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Bemis & Call Hardware & Tool Co.



PATENT COMBINATION WRENCH.

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, case-hardened throughout, and not only combine all of the superior qualities of our Cylinder or Gas Pipe Wrenches, but also all requisite combinations of a regular Nut Wrench, thus making a combination which has no equal.

For Circulars and Price List, address

BEMIS & CALL HARDWARE & TOOL CO., Springfield, Mass.

GUN POWDER.

Laflin & Rand Powder Co.

No. 29 Murray Street, New York, Manufacture and sell the following celebrated brands of Sporting Powder known everywhere as

ORANGE LIGHTNING,

ORANGE DUCKING,

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more popular than any Powder now in use.

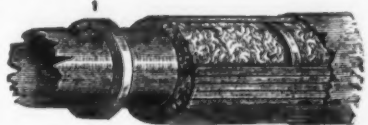
Blasting Powder and Electrical Blasting Apparatus.

Military Powder on hand and made to order.

SAFETY FUSE, FRICTIONAL & PLATINUM FUSES.

Pamphlets showing sizes of grain sent free.

Mineral Wool.



A fibrous material, encasing about 90 per cent. of its volume of air, and therefore a superior

NON-CONDUCTOR

OF

HEAT AND SOUND.

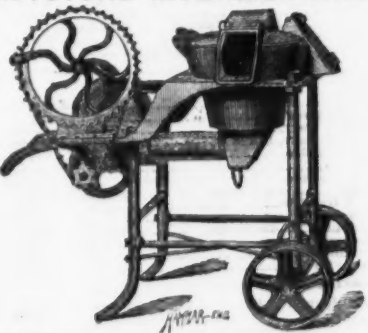
Being made from the slag of blast furnaces, it is fire-proof and durable in contact with heated surfaces. Readily applied.

Heaviest grade about 25 lbs. per cubic foot. Price, 1 cent per lb.

U. S. MINERAL WOOL CO.,

16 Cortlandt St., New York.

KEYSTONE RIVETING FORGE.



An Improved Pattern.

Cheap and Durable.

BEST IN THE MARKET.

Send for catalogue to

KEYSTONE PORTABLE FORGE CO.,

204 North 4th St., Philadelphia, Pa.

John Waldron,

Manufacturer of

Sprout's Double and Single Shear

Horse Hay Forks

And

Sprout's

HAY ELEVATORS,

PULLEYS and GRAPPLES.

Send for Circulars.

Muncy, Lycoming Co., Pa.

WM. ESTERBROOK,

Wholesale Manufacturer of

Coal Hods,

311 Cherry St., PHILADELPHIA.

THE SAFETY

Combines every advantage possible in an

ICE CREEPER.

Attaches with a thumb screw; turns over into

steps; one size for all.

R. P. SCOTT & CO.,

Manufs., NEWARK, N. J.

FOR SALE,

At New England Machinery Depot,

308 North Third St., Philadelphia, Pa.

Horizontal, Vertical and Locomotive Tubular

Boiler, from 3 to 60 H. P., in stock and larger to

order. Engines all sizes. Pumps, Heaters, In-

jectors, steam and hand Brick and Mortar Molds.

Boiler Test Pumps. The new Gravity Coffee

Roaster. All of the above constantly kept in stock.

Send for circular and price list.

STOVE REPAIRS.

Repairs for Stoves made at Troy, Albany, Ro-

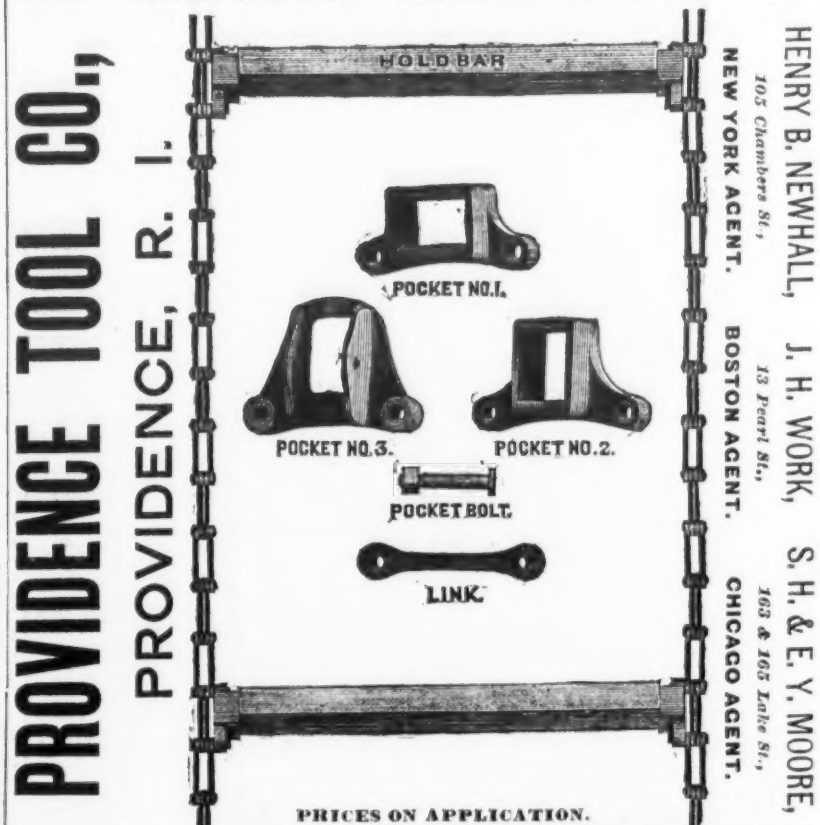
chester, Cleveland, Buffalo, Boston, St. Louis,

Quincy, Chicago, Milwaukee and elsewhere, at

W. C. METZNER

127 W. Randolph St., Chicago, Ill.

ICE ELEVATOR CHAIN & BLOCKS.



PROVIDENCE TOOL CO.,

PROVIDENCE, R. I.

HENRY B. NEWHALL, J. H. WORK, S. H. & E. Y. MOORE,
105 Chambers St., NEW YORK AGENT.
13 Pearl St., BOSTON AGENT.
103 & 105 Lake St., CHICAGO AGENT.

PRICES ON APPLICATION.

THE GENUINE STEBBINS

MOLASSES & OIL GATES,

MANUFACTURED ONLY BY

E. STEBBINS MFG. CO.

BRASS FOUNDERS AND FINISHERS.

Sole Manufacturers

Stebbins and Bright-

wood

COMPRESSION

AND

GROUND KEY WORK.

Send for circular and price

list.

H. M. BREWSTER, Agent.

Brightwood P. O., Mass.



Office of **NELSON LYON,**

SOLE MANUFACTURER OF

Lyon's Patent Metallic

Heel Stiffeners,

Also, Manufacturer of

BRUSHES

Of Every Description,

Nos. 17 & 19 Green St.,

Albany, N. Y., Dec. 8, 1880.

To All Whom it May Concern:

To-day a decree in my suit against G. T. Fisher & Co., of Detroit, for an

infringement of my patent, was made and entered, of which the following is an extract:

At a session of the Circuit Court of the United States for the Eastern District of Michigan, held at Detroit

&c., on Wednesday, the 8th day of December, 1880.

NELSON LYON

against

GUYON T. FISHER, et al.

It is ordered, adjudged and decreed, that the act entitled "An act for the relief of Nelson Lyon and Jere-

miah S. James," passed by Congress and approved April 1, 1880, &c., is a good, valid and constitutional act.

That the original patent, bearing date July 9, 1872, and numbered 128,842, granted and issued to Joseph

Baraloux, Jeremiah S. James and Nelson Lyon, when corrected by the Acting Commissioner of Patents, as

directed by said act, was a good and valid patent.

That the said Joseph Baraloux was the original and first inventor of the improvements in metallic stiffen-

ers for boots and shoes herein mentioned and described in said letters patent.

That the said Nelson Lyon is the assignee of said Joseph Baraloux, and is the owner of said patent.

That the said Nelson Lyon is the exclusive possessor of said letters patent and the invention thereby secured.

That the defendants, G. T. Fisher & Co., and each of them, have infringed upon the said patents and upon

the exclusive rights of said Lyon under the same.

That said Lyon receive of said defendants all the profits, &c. they have made, and in addition thereto all

the damage he has suffered by reason of the infringements by the defendants, and also the costs, charges and

disbursements in the action.

It is also further ordered, adjudged and decreed, that a perpetual injunction be issued against said defend-

ants, according to the prayer of the said complainant's bill.

You are also hereby notified that the perpetual injunction has been issued and served on the defendants.

All questions as to damages and settlements in relation to infringements under my

patents must be addressed to and made with my attorney, WILLIAM H. KING in my care

at the above address.

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MANUFACTURERS AND

Importers of STEEL,

Removed to 30 Gold Street, New York.

Particular attention is paid to quality and temper for FILES, SAWS, EDGE TOOLS,
 TABLE AND POCKET CUTLERY, TOOLS, TAPS AND DIES; also for COLD ROLLED STEEL FOR
 CLOCK SPRINGS, CORSET CLASPS, &c.

A Large Assorted Stock of JOHN ROTHERY'S FILES always on hand.

Warranted Superior to any Steel in the Market, either
 English or American, for every purpose.

Also,

Combination Chrome Steel and Iron for
 Safes, Jails and Deposit Vaults.

Send for Circular
 and
 Price List.

Chrome Steel Works,
 Kent Avenue and Keap Street,
 BROOKLYN, E. D., N. Y.
 Chicago Branch,
 40 Dearborn Street,
 Cincinnati Branch,
 123 Central Avenue.

JOLIET STEEL COMPANY,

MANUFACTURERS OF

Steel Rails,

ALL WEIGHTS.

The Company warrant its Rails equal in quality to any manufactured in the
 United States.

ALEX. J. LEITH, President.
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 C. E. SARGENT, Secretary.

CHICAGO.

Office, Rooms D and E, Honore Building.

H. S. SMITH, General Supt.
 JOLIET.

Works, Joliet, Ill.

Steel.

**R. MUSHET'S
 Special Steel**

FOR

LATHES, PLANERS, &c.

Turns out at least double work by increased speed
 and ease, and cuts harder metals than any other
 steel. Neither hardening nor tempering required.

Sole Makers,

SAMUEL OSBORN & CO.,

Sheffield, England.

Represented in the United States by

B. M. JONES & CO.,

No. 11 & 13 Oliver Street, BOSTON.

NAYLOR & CO.,

99 John St., New York. 6 Oliver St., Boston, Mass.

W. R. HART, Agent,

208 S. Fourth St., Philadelphia, Pa.

IMPORTERS OF

STEEL AND IRON RAILS,

Tin and Terne Plates,

Swedish and Norway Iron,

BESSEMER STEEL WIRE RODS,

Pig Iron, Spiegeleisen, Ferroman-

ganese, Scrap Steel and Old

Iron Rails.

MANUFACTURERS OF

STEEL COMPRESSED SHAFTING,

"Benzon" Homogeneous Plates

For Boilers, Fire-boxes, &c.

Axles, Crank Pins, Spring Steel,

And all other kinds of

Martin-Siemens Steel and Iron

For Railroad purposes.

REYNOLDS, CARTER & REYNOLDS,

3 Clements Lane,

Lombard Street, LONDON, E. C.

Cable Address:

REYNOLDS,

London,

Iron and Steel Merchants

AND

ENGINEERS.

Exporters of

Iron and Steel Rails, Blooms, Spiegeleisen,

Pig Iron, Old Rails, Scrap Iron, Iron Ore,

and all kinds of Railway Plants,

Engines and Piping for Water-

works, Mining Machinery, &c.

JOHN H. WRIGHT,

Manufacturer of

MACHINISTS' TOOLS

FROM THE LATE

WOOD, LIGHT & CO.'S PATTERNS

Of Lathes and Planers.

Mr. Wright having formerly been a contractor
 in building the same, will give superior work to all
 who favor him with their orders.

Gear Cutting a Specialty.

237 Water Street,

BRIDGEPORT, CONN.

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A. PARDEE & CO.

237 South Third St.,

PHILADELPHIA,

No. 111 Broadway, New York.

MINERS AND SHIPPERS OF

Lehigh Coals.

The following superior and well-known Lehigh
 Coals are mined by ourselves and firms connected
 with us, via.

A. Pardee & Co. {HAZLETON,
 CRANBURY,
 SUGAR LOAF.

Pardee, Bro. & Co. LATTIMER.

Calvin Pardee & Co. HOLLYWOOD.

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EMPIRE STATE MFG. CO.

BUFFALO, N. Y.



Copper,

Half Copper,

Nickel Plated

TEA KETTLES.

Metal Spinning.

Steel.

CARNEGIE BROS. & CO., LIMITED,
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EDGAR THOMSON STEEL WORKS DEPARTMENT.
Works at Bessemer Station, P. R. R.

Branch Office and P. O. Address, 48 Fifth Ave.,
MANUFACTURERS OF



Union Iron Mills Department
Mills at Thirty-third St. and A. V. R. R.

Branch Office and P. O. Address, Thirty-third St.
MANUFACTURERS OF

STRUCTURAL IRON.

Bridge Iron, Iron Beams, Channel Bars, Car Truck Channels, Angles, Tees,
Universal Mill Plates, Bar Iron, Light Steel and Iron Rails.

Special attention given Unusual Shapes and Sizes.

Lithographs of sections and book of detailed information giving calculation of strain, &c., furnished
to Engineers and Architects on application.

NEW YORK OFFICE: Room 32, No. 55 Broadway, N. Y.

NORTH CHICAGO ROLLING MILL CO.
ESTABLISHED 1877. CAPITAL, \$3,000,000. INCORPORATED 1869.

Works at Chicago, Ill., and Milwaukee, Wis.

MANUFACTURERS OF

**MERCHANT BAR, FISH PLATES, PIG METAL,
IRON RAILS & BESSEMER STEEL RAILS.**

Present Annual Capacity of these Works.	15,000 tons
Fish Plates	40,000 "
Merchant Bar	110,000 "
Pig Metal	110,000 "
Iron Rails	30,000 "
Steel Rails	40,000 "
Total Capacity per year.	435,000 "

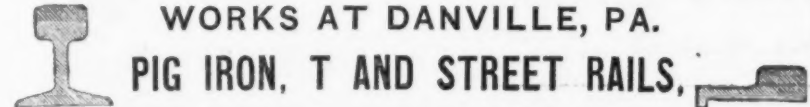
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O. W. POTTER, President, CHICAGO.
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THE MONTGOMERY IRON & STEEL COMPANY.

WORKS AT DANVILLE, PA.



A general assortment of mine and narrow gauge rails kept on hand, from which shipments can be made promptly.
W. E. COX, President, Reading, Pa. F. P. HOWE, Gen'l Sup't, Danville, Pa. S. W. INGERSOLL, Treasurer, 227 South Fourth St., Philadelphia, Pa.

THE SIEMENS-ANDERSON STEEL CO.,
Successors to ANDERSON & CO.,
Manufacturers of

Crucible Tool, Cast Spring, Cast Plow, Iron Centre,
Soft Centre, and Iron Back Plow, also Open Hearth
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ALL DESCRIPTIONS OF STEEL.

And Sole Proprietors of the Siemens Direct Process in the United States.

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Established 1781. OBERHAUSEN, ON RUHR. 8500 men employed.

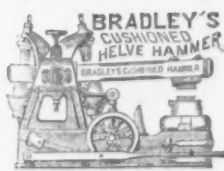
BRAND:

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STEEL RAILS, STEEL WIRE RODS,
STEEL BLOOMS, SPIEGELEISEN,
FERROMANGANESE UP TO 75 PER CENT.

GODEFFROY & CO., Sole Agents for the United States,
43 New Street, NEW YORK.

CHAINS
MILLER CHAIN CO., Akron, O.
Coil, Cable, Crane, and
Agricultural Chains.



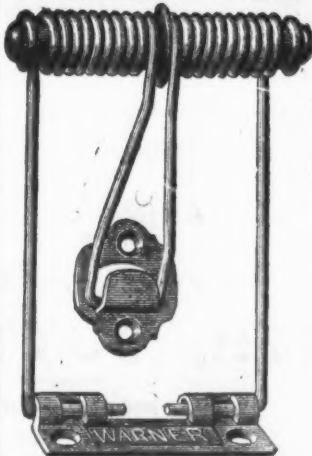
Bradley's Cushioned Helve Hammer

Awarded first premium, Silver Medal, at American Institute Fair 1873; Cincinnati Industrial Exposition, 1874 and 1880, and the Diploma of Honor and Grand Medal of Merit at the Centennial Exhibition in 1876, being the highest award given any goods of their class in America or Europe. It has more good points, does more and better work, takes less power, costs less for repairs, than any Hammer in the world. Guaranteed as represented. Established 1832.

BRANCH OFFICE,
46 & 48 West Lake St.,
CHICAGO, ILL.

BRADLEY & COMPANY, Syracuse, N. Y.

THE "WARNER" DOOR SPRINGS



are the most simple, most effective and most convenient ever introduced, and the immense sale we are having shows their great popularity and superiority.

There never was a Spring made that is so durable, so complete in its action, operating with a uniform pressure, holding the door tight when closed, and allowing it to open without increasing the pressure at any point.

When the door is opened about 130 degrees of a circle, it will press and hold it open.

The Spring is easily unhooked and rehooked—in an instant—from the door and also from the jamb, without removing a screw or pin.

This is a Convenience Possessed by no other Spring in the Market.

We are making this season three sizes, viz:

No. 1 For Screen or Light Storm Doors.

No. 2 For Medium Doors.

No. 3 For Heavy Doors.

They are for sale by most of the prominent jobbers of the United States and Canada.

Correspondence solicited.

FREDERIC BARTLETT,
FREEPORT, ILLINOIS.

ESTABLISHED IN 1859.



PUBLISHED EVERY SATURDAY.

THE OLDEST AND CHIEF REPRESENTATIVE OF THE IRON, HARDWARE AND METAL TRADES.

OFFICE: 44a CANNON STREET, LONDON, E. C.

ADVERTISEMENTS AND SUBSCRIPTIONS ARE RECEIVED AT THE VARIOUS OFFICES OF "THE IRON AGE," NAMELY:

NEW YORK OFFICE: DAVID WILLIAMS, Publisher of *The Iron Age*, 83 Reade street, who will, on receipt of application, supply specimen copies free.

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CINCINNATI OFFICE: Builders' Exchange—T. T. MOORE, Manager.
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SPECIAL FEATURES.

Notes of Novelties.—This is a department of the journal always watched with interest by the trade, as it contains an account, from week to week, of the novelties which manufacturers and inventors are introducing to the notice of the trade. These articles are freely illustrated. **Special Correspondents.**—The *Ironmonger* has a deserved reputation for its special correspondence from all the principal Continental, British and manufacturing centers. The writers are gentlemen holding important positions in the districts with which they are connected, and possess facilities for acquiring information specially suited for the columns of the *Ironmonger*. **The Week, Legal Notes, Trade Notes, Bankruptcies, Foreign Notes, Colonial Settings, Merchants' Circulars, &c.**, are each departments of the journal, containing a direct of all matters of direct interest to the Iron, Hardware and Metal Trades. In addition to the above, there is a carefully classified list of Patents, together with Editorial Notes, French and Belgian and other Special Correspondence.

SUBSCRIPTIONS

to the *Ironmonger* and *Metal Trades Advertiser*, with which is sent every fourth week the Foreign Supplement (see below), may commence from an date, but are not received for less than a year complete. The rate is \$5 per annum, inclusive of postage to any part of the world outside Great Britain. To every subscriber is presented, free, in the course of his year, a handsome and useful *Ironmongers' Diary and Text Book*, a work sold to non subscribers at 75 cents.

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SPECIAL ISSUES.

In the spring and autumn of each year there is published a Special Issue, the circulation of which is not less than **Twelve Thousand (12,000)** copies

THE IRONMONGERS' DIARY AND TEXT BOOK.

This is an annual, presented free to every Subscriber to the *IRONMONGER AND METAL TRADES ADVERTISER*. It contains a large number of ruled skeleton pages for diary and other entries, and in addition much useful reference information, varied from year to year. It is handsomely bound in cloth, gilt; and as copies are used in thousands of establishments for a whole year, it is obviously a medium of exceptional value for advertisements. Sold to non-subscribers at 75 cents.

THE FOREIGN SUPPLEMENT,

With which is incorporated The Universal Engineer,

is published every fourth week in connection with the extensive and world-wide circulation of the *Ironmonger* itself. The dates of its publication for the next twelve months will be as follows: NOVEMBER 6, DECEMBER 3 and 31, 1881, JANUARY 28, FEBRUARY 25, MARCH 25, APRIL 22, MAY 20, JUNE 17, JULY 6, AUGUST 5, and SEPTEMBER 2 and 30, 1882.

This Supplement is published in

FOUR LEADING COMMERCIAL LANGUAGES

of the world, including English, and is sent to all the countries where they are spoken, thus placing the contents of the *Ironmonger* not only within reach of the native language of eighty millions of German, forty-two millions of French, twenty-eight millions of Italian, and fifty-one millions of Spanish speaking people; or, in all, over two hundred millions of inhabitants in the principal nations where the best purchasers of manufactured goods are to be found.

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THE WHOLE FOREIGN HARDWARE TRADE

so far as our experience of twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. Thus a Price List or Advertisement inserted in the *Ironmonger* and *Foreign Supplement* is a strikingly powerful and most efficient way of publicity not to be compared with any other ordinary channels of communication.

B. KREISCHER & SONS, FIRE BRICK.

BEST AND CHEAPEST.

Established 1845.

Office, foot of Houston Street, East River,
NEW YORK.

NEWTON & CO.,

ALBANY, N. Y., Manufacturers of

FIRE BRICK

Stove Linings,

Range and Heater Linings

Cylinder Brick, &c., &c.

For Glass and Steel Works.

SILICA,

Bricks and Cement,

English Fire Bricks.

RIMINGTON BROS. & CO.,

Newcastle-on-Tyne.

Agent on this side

S. A. RIMINGTON,

40 & 42 Broadway,

NEW YORK.

M. D. Valentine & Bro

Manufacturers of

FIRE BRICK And Furnace Blocks DRAIN PIPE & LAND TILE.

Woodbridge, - - - N. J.

BORGNER & O'BRIEN,

Manufacturers

FIRE BRICK

Edge Pressed Furnace Blocks,

CLAY RETORTS, TILES, &c.,

Twenty-third Street,

PHILADELPHIA.

Above Race,

Twenty years' practical Experience.

WATSON FIRE BRICK CO.,

ESTABLISHED 1836.

Successors to JOHN R. WATSON, Perth Amboy, New Jersey

Manufacturers of

FIRE BRICK,

FOR ROLLING MILLS, BLAST FURNACES, FOUNDRY
DRIES GAS WORKS, LIME KILNS, TANNERIES,
BOILER AND GRATE SETTINGS, GLASS WORKS, &c.

Fire Clays, Fire Sand, and Kneads for Sale.

HENRY MAURER,

Proprietor of the

Excelsior Fire Brick & Clay

Retort Works.

Manufacturer of FIRE BRICK, HOLLOW

BRICK AND CLAY RETORTS.

WORKS: PERTH AMBOY, NEW JERSEY.

Office and Depot, 418 to 422 East 23d St., N. Y.

TROY FIRE BRICK WORKS,

Troy, N. Y.,

JAMES OSTRANDER & SON,

ESTABLISHED 1848,

Manufacturers of

FIRE BRICK,

Tuyeres Tiles, Blast Furnace Blocks, &c. Miners and

Dealers. Woodbridge Fire Clay and Sand, and Staten

Island Kaolin.

Established 1861.

GARDNER BROTHERS,

Manufacturers of

STANDARD SAVAGE FIRE BRICK,

TILE & FURNACE BLOCKS,

OF ALL SHAPES AND SIZES.

Clay Gas Retorts and Retort Settings, and

Miners and Shippers of Fire Clay.

OFFICE: 116 Smithfield St., Pittsburgh, Pa.

WORKS: Mt. Savage Junction, Md., and Lockport, Pa.

HALL & SONS,

FIRE BRICK,

Buffalo, N. Y.

CHAS. D. COLSON,

FIRE BRICK,

Foundry Facings, Sand, Tools and Supplies.

CHICAGO, ILL.

UNION MINING COMPANY.

Mount Savage Fire Brick.

EDWARD J. ETING, Agent,

No. 230 South Third St., Philadelphia, Pa.

THOMAS MORTON,

Manufacturer of

CABLE, COPPER, IRON AND STEEL SASH CHAINS.

for suspending window shades. Also, Copper Cham-

pion Chains, with patent attachments, for same pur-

pose. Agents wanted in the principal cities of the

United States. Apply at
65 Elizabeth Street, New York.

HENRY DISSTON & SONS,

KEYSTONE SAW, TOOL, STEEL & FILE WORKS,

Front and Laurel Streets,

PHILADELPHIA.

DISSTON'S SAMSON TREE PLANTER AND POST HOLE DIGGER.

Fig. 1.

Patented May 29, 1870.

Price, - - - \$37.50 per dozen.

Fig. 2.



No Farmer, Nurseryman, Railroad
or Telegraph Company
SHOULD BE WITHOUT ONE.

NO BACK-ACHE.

NO KNEE-WORK.

NO CLOGGING.

This tool has been thoroughly tested, and has given
the greatest satisfaction to all who have tried it. The
principle on which it works makes it self-cleaning and
prevents adhesion in sticky soil; therefore it always
works free and easy. It is far superior to all plungers,
augers and boring machines, as it works well in stony,
sandy, or clay soils; quicksand under water is as easily
removed as though no water existed.



DIRECTIONS.

Plunge the Digger into the ground, as shown in cut, Fig. 1, and when the soil is loosened pull out the lever with one hand, as shown in cut, Fig. 2, which will press the dirt between the blades; then draw the Digger from the hole, keeping hold of the lever with one hand and the handle with the other. When the Digger is clear of the hole, you can deposit the load anywhere within reach by simply pressing down the lever, which will open the blades and the dirt will fall from between them. The Digger is then ready for another plunge. The steel blades are nine inches long, and the whole tool five feet long. For sale at Hardware and Agricultural Stores.

HENRY DISSTON & SONS.

STANDARD SHAFT COUPLING SPRING.

Chicago, 7

July 24, '81.

Gentlemen:

You may enter

our order for

5000 sets of your

Standard Shaft

Coupling Springs

(50 sets a month).

A. A. ABBOTT

& CO.

Side View.

One dozen pairs, japanned

expressed to the respon-

sible Hardware or Carriage

trades for \$1.50 (per gross,

\$15.4 mos. note, 5 per cent.

off 30 days, or off spot cash).

Discount to jobbers. Splen-

did selling article for com-

mercial travelers. (Nickel

plated springs \$5 per doz.

pairs. Dealers and the

trade also supplied by the

E. D. Clapp Mfg. Co., Au-

burn, N. Y., and Wilcox &

Howe, Birmingham, Conn.;

Crandall, Stone & Co.,

Mfrs. Carriage Trimmings,

Binghamton, N. Y.

Perfect Anti-Rattler and Shaft

Bolt Locker, and looks

neat on a buggy. Sold by all

hardware dealers every-

where. Orders, large or small,

filled promptly.

A. G. MOREY & CO., 90

Randolph Street,

(McCormick Block), CHICAGO.

Manufacturers for U. S. &

Canada, under Letters

Patent.

Front View.

Howe, Birmingham, Conn.;

Crandall, Stone & Co.,

Mfrs. Carriage Trimmings,

Binghamton, N. Y.

Perfect Anti-Rattler and Shaft

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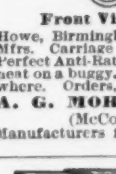
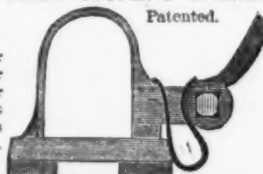
Front View.

Howe, Birmingham, Conn.;

Crandall, Stone & Co.,

Mfrs. Carriage Trimmings,

Binghamton, N. Y.



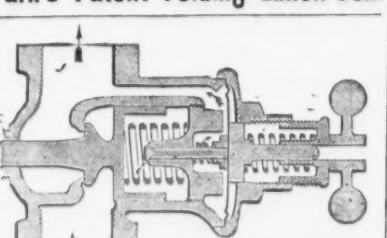
WM. L. DAVIS, Chelsea, Mass.,

Manufacturer of

WINDOW WEIGHTS,

Sole Manufacturer of

Park's Patent Folding Lunch Box.



Curtis Pressure Regulator.

Is made entirely of metal; occupies the same space

as a globe valve. It has no glands or packing, and is

a lock-up valve. Write for circular. Manufactured by

CURTIS REGULATOR CO.,

59 Beverly Street, BOSTON, MASS.

HOWARD IRON WORKS,

BUFFALO, N. Y.,

Manufacturers of

BENCH VISES,

Price Lists sent on application.

STEEL BRASS RUBBER

STAMPS STENCIL BRANDS

STAMPING INK &c.

A. M. MICHAEL, ALBANY, N. Y.

Brass Molders and Manufacturers

write for sample and price of Fine Red Brass

Molding Sand.

W. J. CHAPMAN, Baltimore, Md.

Gentlemen.—This cut illustrates our CAST IRON

Furnace Lamps

which are superceding entirely the Tin Lamps
wherever introduced, in consequence of their dur-
ability. They are now extensively used in the
Iron Districts of Ohio and some in Pennsylvania.
We call your attention to and solicit your order
for them, confidently asserting that they are an
A No. 1 article in every respect.



Sample sent if desired.

PRICE, \$12 PER DOZEN.

Taylor & Boggis,
CLEVELAND, O.

ROCKING BLOCK GRATE,

Williams' Patent,

J. Q. MAYNARD,

General Agent.

97 Liberty Street, NEW YORK.

Fire level. Accumulation of cinders impossible.

No cleaning out of fires during the day. Parts

easily and cheaply replaced. Seventy per cent.

of air space. Thirty days' trial.

Send for circular.

JACK SCREWS,

Press Screws, &c.

Cast with Perfect Seamless Thread by our new patent process.

Cheaper than Wrought Iron, not so apt to bend or strip the

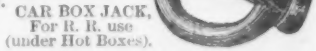
thread. Liberal discount to the trade.

SEEEGER MFG. CO.,

Box 1513, SPRINGFIELD, MASS.

H. E. ASHCRAFT, Agent,

12 Murray St., and 15 Park Place, New York.

CAR BOX JACK,
For L. H. use
(under Hot Boxes).

GREEN'S PURE SILICA FIRE BRICK,

MADE BY

LACLEDE FIRE BRICK MANUFACTURING CO.,

SPECIALLY ADAPTED FOR

Pernot and Siemens Open Hearth
Steel Furnaces and for Glass Furnaces.

Office, 901 Pine St., St. Louis, Mo.

John T. Lewis & Bros.
No. 231 South Front St.,
PHILADELPHIA.

TRADE MARK.

MANUFACTURERS OF

Pure White Lead, Red Lead, Litharge,
Orange Mineral, Linseed Oil,
AND PAINTERS' COLORS.

Brooklyn White Lead Co.



TRADE MARK

White Lead, Red Lead & Litharge.

No. 182 Front Street,

NEW YORK.

JOHN JEWETT & SONS,

Manufacturers of the well-known brand of

WHITE LEAD.

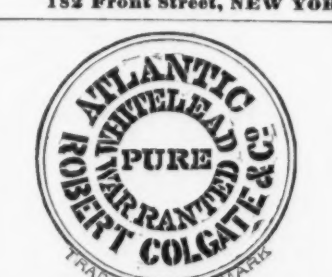


TRADE MARK

ALSO MANUFACTURERS OF

LINSEED OIL.

182 Front Street, NEW YORK.



The Atlantic White Lead and

Linseed Oil Co.,

Manufacturers of

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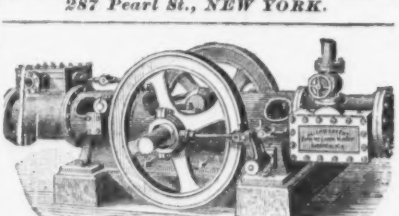
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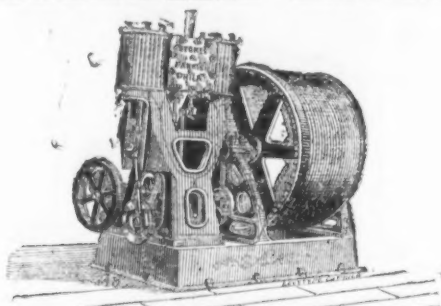
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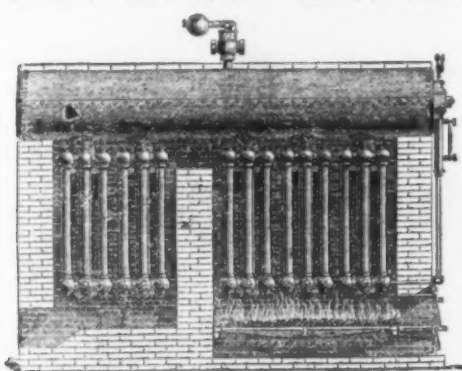
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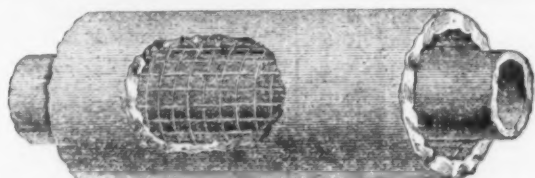
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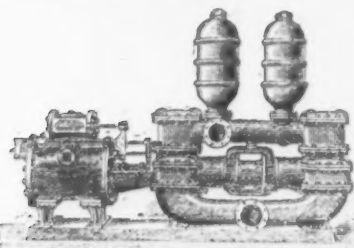
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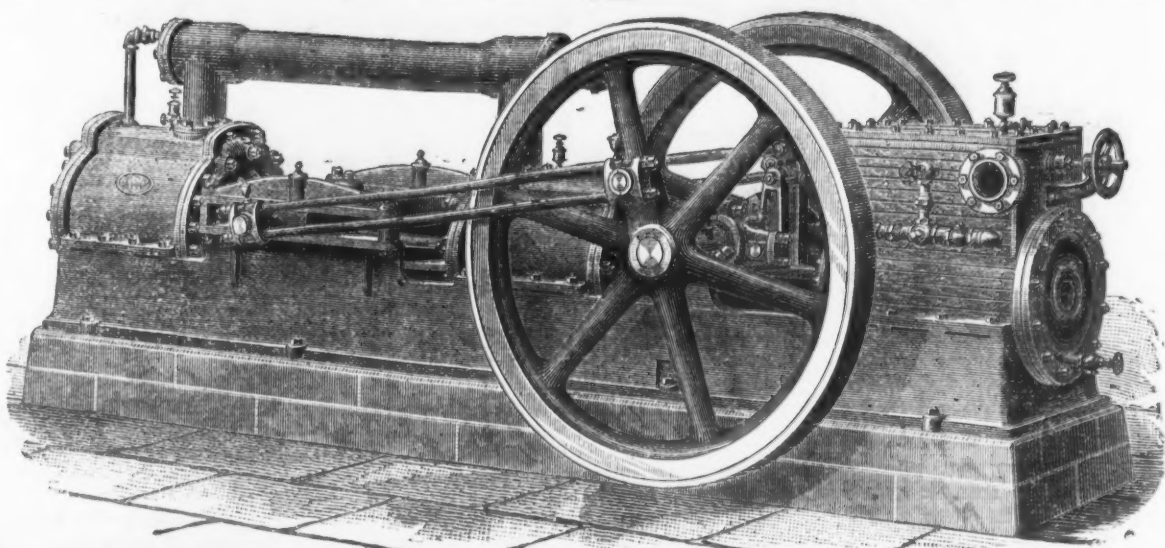
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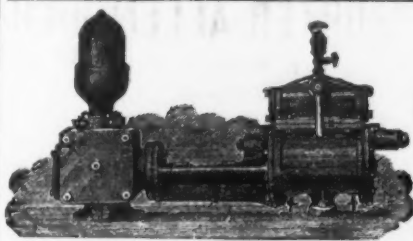
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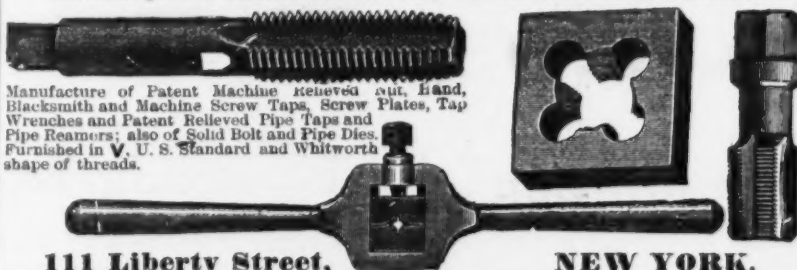
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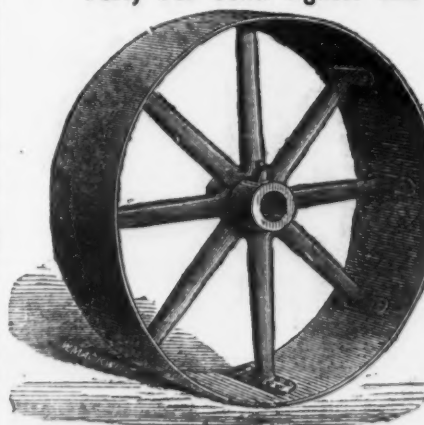
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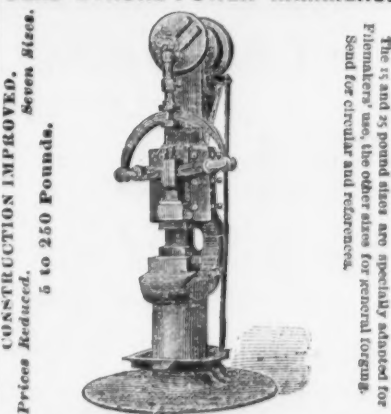
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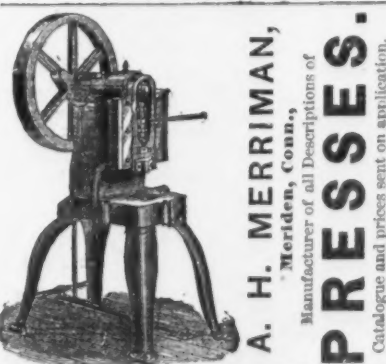
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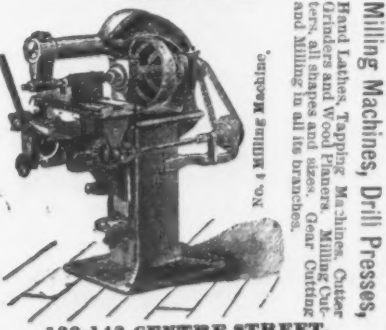
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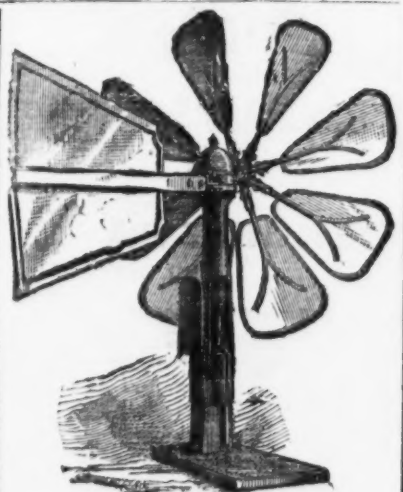


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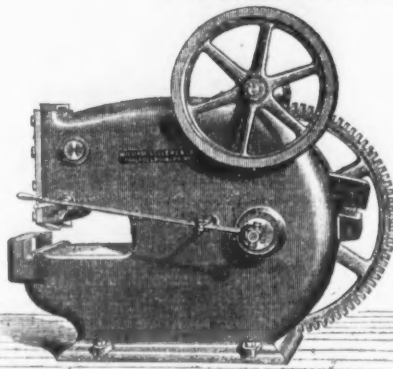
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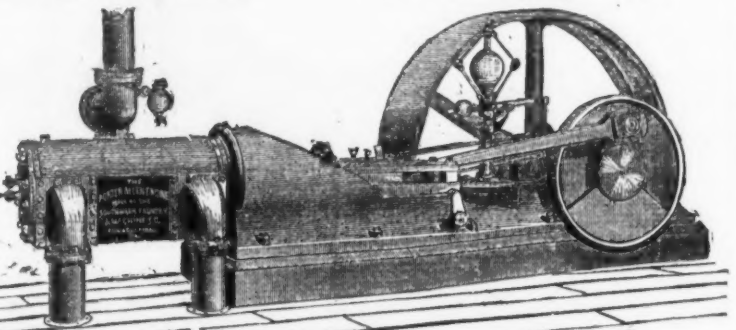
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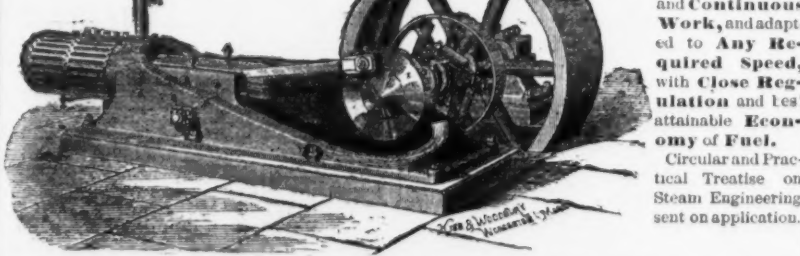
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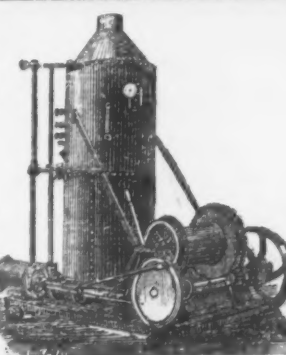
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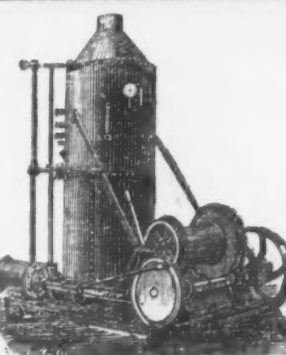
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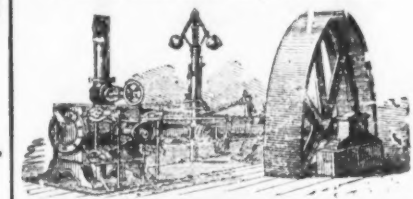
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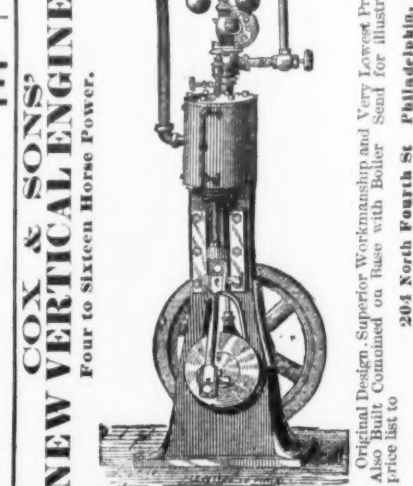
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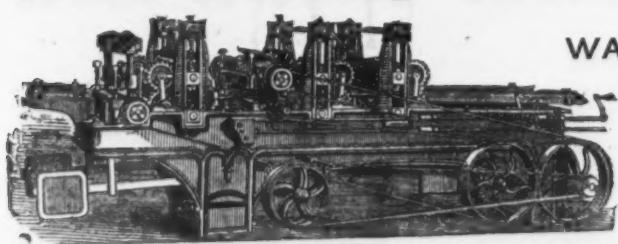
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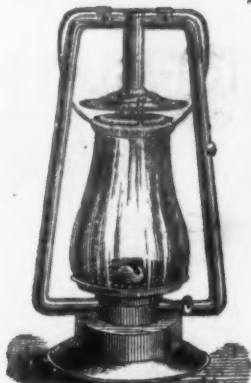
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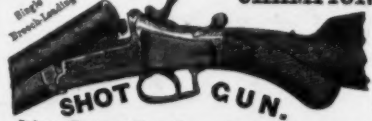
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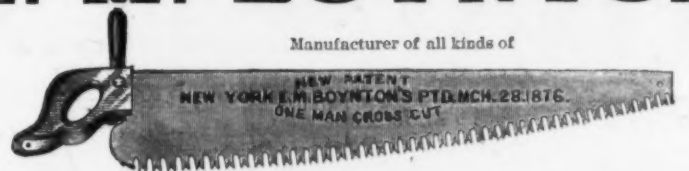
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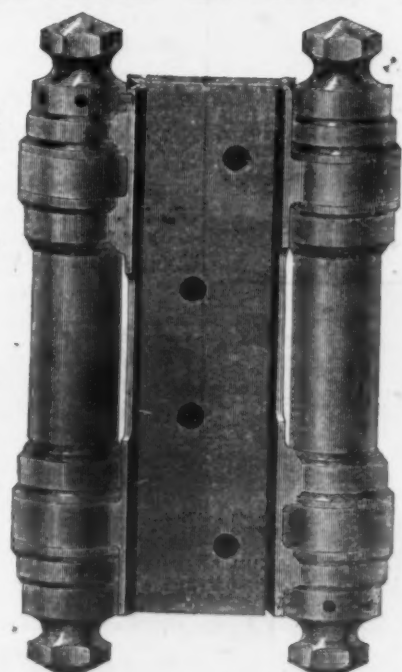
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